USAPHC
U.S. ARMY PUBLIC HEALTH COMMAND
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Injury Report Report No. WS.0030637.3, October 2014

Evaluation of the Iron Horse Performance Optimization Physical Training Program (IHPOP) in a Light Infantry Brigade, October 2010 - April 2011

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General Medical: 500A, Public Health Survey

ACKNOWLEDGEMENTS

REPORT DOCUMENTATION PAGE	Form Approved OMB No. 0704-0188

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1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From – To)*
19-06-2014	FINAL	October 2010-April 2011

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Evaluation of the Iron Horse Performance Optimization Physical Training Program (IHPOP)	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S) Tyson Grier, Michelle Canham-Chervak, Morgan K Anderson, Timothy T Bushman, Bruce H Jones	**5d. PROJECT NUMBER** WS.0030637.3
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
U.S. Army Public Health Command, Aberdeen Proving Ground, Maryland 21010	

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
U.S. Army Public Health Command, Aberdeen Proving Ground, Maryland 21010	USAPHC
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

A variety of exercise and conditioning programs with greater focus on injury reduction and improved physical fitness are currently being implemented by brigades and battalions throughout the United States Army. The Iron Horse Performance Optimization physical training program (IHPOP) was developed to increase medical readiness through injury reduction and improved rehabilitation / reconditioning to optimize fitness. The IHPOP was based on the exercises and guidelines from the U.S. Army Physical Readiness Manual (TC 3-22.20). **Purpose:** To evaluate the effect of a new physical training program (IHPOP) on injury risks and to identify risk factors for injury in a Brigade of an Infantry Division (ID). The program included the addition of physical therapy and athletic training staff to improve rehabilitation and implementation of physical training (PT) activities emphasizing cross-training and lower running mileage. **Methods:** Demographics, physical fitness, and PT activities were obtained from surveys administered to Soldiers upon program implementation and 7 months later. Medical records captured injury-related encounters for 7 months before and 7 months after implementation. Pre- and post-implementation changes were assessed by comparing two rates (injury) and Wilcoxon Signed Rank test (fitness, PT). Army and brigade injury rates were compared using linear regression. **Results:** Both surveys and medical data were available for 1,250 Soldiers; data on matched males (n=1,183) were analyzed. Injury incidence pre- and post-implementation did not differ (55 vs. 57/1,000 Soldiers/month, p=0.64) and no difference between Army and brigade trends was observed (p=0.72). However, limited duty days increased after the implementation of IHPO by 32%. Fitness improved, although the changes measured by Army Physical Fitness Test total scores were significant the improvements were minimal (251 vs. 255 points, p<0.01). The proportion of Soldiers running ≥10 miles/week with their unit decreased (36% vs. 26%, p<0.01) and the proportion cross-training with their unit ≥1 time/week increased (66% vs. 75%, p<0.01). **Conclusion:** While injury rates did not change, the number of limited duty days increased by 32%. For physical training, running mileage decreased, while cross-training increased. Improved access to care may have increased injury identification, thereby masking reductions resulting from PT modifications. A longer period of study is needed to fully assess program effects.

15. SUBJECT TERMS:

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER *(include area code)*
Unclassified	Unclassified	Unclassified			

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1 Summary

1.1 Overview

The Iron Horse Performance Optimization Program (IHPOP), was a physical training program developed by an infantry brigade to reduce musculoskeletal injuries and improve overall physical performance. In the fall of 2010 the IHPOP was implemented and replaced the current physical training (PT) program which primarily consisted of traditional Army PT (running, push-ups, sit-ups, and calisthenics). The IHPOP was based on the exercises and guidelines from the U.S. Army Physical Readiness Training (PRT) Manual (TC 3-22.20, now updated and revised to Field Manual (FM) 7-22) and implemented through the oversight of a musculoskeletal action team (MAT). The MAT consisted of a physical therapist, a physical therapy assistant, two athletic trainers, and two certified strength and conditioning coaches. Prior to implementation of the IHPOP and the MAT the brigade requested assistance with evaluation of the program from the Army Institute of Public Health (AIPH).

1.2 Purpose

To evaluate the effect of a new physical training program (IHPOP) on injury risks and to identify risk factors for injury in the brigade.

1.3 Methods

In October/November 2010, the AIPH Injury Prevention Program administered surveys to the brigade asking participants about unit physical fitness training, personal fitness, injuries and tobacco use during the prior 12 months (before IHPOP implementation). As part of the new physical training program the brigade also conducted a comprehensive battery of baseline physical fitness tests. In April 2011, approximately 1 month before the brigade was scheduled to deploy, AIPH returned to the military installation to administer a follow-up survey. Physical fitness tests were not conducted due to Soldier Medical Readiness Processing and the limited time before they were scheduled to deploy.

1.4 Results

There were 1,183 men and 67 women who completed both surveys and on whom injury data could be obtained from the Defense Medical Surveillance System (DMSS). Since there were only 67 women, analysis for those who completed both surveys was based on men only. The proportion of Soldiers running ≥10 miles/week and road marching >2 times per month with their unit decreased by 10% and 17%, respectively, after the implementation of IHPOP. In place of running and road marching Soldiers performed more of the following activities ≥ 1 time per week; cross-training (10%), sprint training (7%), resistance training (6%), and agility training (18%). Physical fitness performance slightly increased after IHPOP for muscular endurance (push-ups) and total APFT score. Aerobic endurance slightly decreased after IHPOP. Although significant these changes were minimal and not very indicative of improved or decreased performance.

Average injury incidence per month remained similar before and after the implementation of IHPOP. Injury rate trends were compared between the brigade, U.S. Army Forces Command (FORSCOM) and the U.S. Army during the months IHPOP was being performed in the brigade. Similar injury rate trends were found between the three groups. The average number of limited duty days per month increased by 32% after the implementation of IHPOP. The average increase in limited duty days was primarily attributed to more limited duty days given after the implementation of IHPOP for strains and sprains. Higher risks of injury occurred among Soldiers who had poor performance on the 2-mile run, were smokers, obese or ran ≥ 20 miles per week for personal PT.

1.5 Conclusions and Recommendations

Given that injury rates and fitness performance were similar before and after IHPOP implementation, no recommendation can be made for or against implementation of IHPOP. Limited duty days increased with the implementation of IHPOP, but this may have been an effect of having additional unit based medical providers. A longer evaluation period is needed to determine the effect of a MAT on limited duty days. Reductions in unit PT running mileage and road marching with the addition of cross-training, agility training and sprint training had minimal effects on fitness performance. The goal of an optimal cardiovascular exercise program would be to determine the balance between aerobic endurance training and cross training that would effectively increase aerobic capacity and minimize injury risk. Weight loss programs may reduce excess body fat by offering effective nutritional interventions which may in turn decrease injury rates. Smoking and other tobacco cessation programs may also decrease injury rates while reducing commonly known tobacco-related illnesses.

2 References

See Appendix A for a complete list of reference information.

3 Authority

Under U.S. Army Regulation (AR) 40-5, Section 2-19, the U.S. Army Public Health Command (USAPHC) is responsible for providing epidemiologic consultation and program evaluation services in the area of injury prevention and control to Army commands and direct reporting units upon request (Department of the Army (DA), 2007).

4 Background

4.1 Mission

To evaluate the IHPOP and embedded injury medical care providers (a new physical training program with a MAT) on injury rates and physical fitness and to identify risk factors for injury in an infantry brigade.

4.2 Oversight

The USAPHC has oversight of this evaluation.

4.3 Background

In the spring of 2010 an infantry division performed an analysis that found 69% of the non-deployable population was medically not ready and 45% of those not medically ready were due to musculoskeletal injuries. In an effort to improve these statistics the IHPOP was developed to reduce musculoskeletal injuries and improve overall physical performance. In the fall of 2010 the IHPOP was implemented by a brigade within the division and replaced the former physical training program which consisted primarily of traditional Army PT (running, push-ups, sit-ups, and calisthenics). To implement this new program, a MAT was embedded into the brigade consisting of a physical therapist, a physical therapy assistant, two athletic trainers, and two certified strength and conditioning coaches. A dietician from the Army community hospital was also assigned to work with the brigade. The program's intent was to maximize deployability by minimizing musculoskeletal injuries during training, shortening recovery time after injury, and maintaining these gains after Soldiers were deployed. The IHPOP was based on the exercises and guidelines outlined in the U.S. Army PRT Manual (TC 3-22.20, now updated and revised in Field Manual (FM) 7-22) and implemented with the oversight and expertise of the MAT. To evaluate this new physical training program, the brigade requested assistance from the Office of the Surgeon General (OTSG), who in turn requested assistance from the AIPH in June 2010. A site visit was conducted by AIPH's Injury Prevention Program in early October 2010, during which information was obtained on these training programs and the availability of outcome data such as injuries, training, and physical fitness measures. Based on this site visit, the AIPH, OTSG and 4th ID representatives decided to proceed with the program evaluation.

5 Methods

5.1 Data Collection

In October/November 2010, AIPH administered surveys to the brigade asking participants about unit physical fitness training, personal fitness, injuries, and tobacco use during the prior 12 months (before IHPOP implementation). At the time of the survey, the unit conducted a battery of physical fitness tests. These tests included pull-ups, a broad jump and Functional Movement Screening (FMS), (Appendix B Table 6.3). FMS involves 7 tests: deep squat, hurdle step, in-line lunge, shoulder mobility, active straight leg raise, trunk stability push-ups, and rotary stability.[1] Each test has a range of 0-3 points with a maximum possible score of 21 if the individual demonstrates sound biomechanics throughout each movement and does not experience pain. If pain is present, the individual scores a zero for that particular test. The Army physical fitness test (APFT) scores were also collected from each battalion.

In April 2011, approximately 1 month before the brigade was scheduled to deploy, AIPH returned to the military installation to administer a follow-up survey. The survey asked participants about unit physical training activities and the IHPOP, personal fitness, injuries and tobacco use. Physical fitness tests were not conducted by the brigade due to scheduling conflicts with pre-deployment Soldier Medical Readiness Processing and the limited time before they were scheduled to deploy. APFT scores were collected from each battalion.

Demographic and injury visit data (inpatient and outpatient International Classification Disease 9th Revision (ICD-9) diagnosis codes) from March 2010 to April 2011 were acquired from the DMSS, maintained by the Armed Forces Health Surveillance Center (AFHSC). Injury data for individuals was linked with roster and physical fitness test data. Injuries were categorized into three groups using the primary (first) ICD-9 diagnosis code: overall injury, overuse injuries, and traumatic

injuries, consistent with prior studies of military training injuries[2] [3] [4] and with recommendations of the Department of Defense (DOD) Military Injury Metrics Work group. Injury incidence and risk factors were analyzed for the period before initiation (March 2010 – September 2010) and after full implementation of the IHPOP (October 2010 – April 2011).

5.2 Data Analysis

The Statistical Package for the Social Sciences (SPSS®), Version 19.0, was used for statistical analysis. Descriptive statistics (frequencies, distributions, means, standard deviations (SD)) were calculated for personal characteristics, physical training, and physical fitness. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m^2). BMI was categorized according to the Centers for Disease Control and Prevention (CDC) classifications for "normal", "overweight", and "obese." Current cigarette smokers were defined as those Soldiers who smoked at least 1 cigarette within the last 30 days and smoked 100 or more cigarettes in their lifetime. Pre- and post-implementation changes (injury, fitness, physical training) were assessed using the Wilcoxon Signed Rank test, The Marginal Homogeneity Test, or the McNemar Test as appropriate. Trends in Army, FORSCOM, and the brigade injury rates during the period IHPOP was being performed were plotted and linear regression lines were created. A second linear regression model was calculated to compare injury rate trends between the groups, using dummy coded variables for Army, FORSCOM, and the brigade. The p-value and the differences between slopes are reported. To identify potential injury risk factors among Soldiers in the brigade, injury risk ratios and 95% confidence intervals (95%CI) were calculated using the electronic medical record data on overall injuries occurring after the implementation of the new exercise programs. A backward stepping multivariate logistic regression model was used to assess key factors for association with injury risk in this population. Variables entered into the backward stepping model were chosen from the univariate models and had a significance of ≤ 0.05 or were determined necessary to control for specific known risk factors. Odds ratios and 95% confidence intervals (CI) were calculated for each potential risk factor. (SPSS® is a registered trademark of the IBM Corporation.)

6 Results

6.1 Descriptive Results—Demographics

The total number of Soldiers in the brigade from March 2010 to April 2011 (counting all of the Soldiers even those who were only there part of the time period) was 5,034 men and 453 women. Approximately 62% of the brigade completed the survey each time it was administered. However, not all of the Soldiers who completed the initial survey completed the final survey. During this time period 1,183 or 24% of men and 67 or 15% of women completed both the initial and follow-up survey and on whom injury data could be obtained from the DMSS. Since there were only 67 women, the analysis for those who completed both surveys was based on men only. The average age of the male Soldier was 27.4 ± 6 years with 26% having a rank of E1-E3 and 62% having a rank of E4-E6. Appendix B contains additional descriptive statistics in section 1-3.

Table 1 displays the changes in selected demographic, unit physical fitness and personal physical training variables before and after implementation of the IHPOP. BMI slightly increased while the number of smokers slightly decreased. The proportion of Soldiers running ≥10 miles/week and road marching >2 times per month with their unit decreased by 10% and 17%, respectively. In place of running and road marching Soldiers performed more of the following activities ≥ 1 time per week for unit PT; cross-training (11%), sprint training (7%), resistance training (6%), and agility

drills (18%). For personal PT 3% more Soldiers began sprint training, while 2% more Soldiers increased the amount of sprint training performed per week.

Table 1. Pre and Post Distribution Percentages of Specific Demographic, Unit and Personal Physical Fitness Training Variables Before and After the Implementation of IHPOP

Variable	Level of Variable	Level of Variable	Before PRT	After PRT	Difference	p -value
Demographic	Age	≤ 22	353 (30%)	258 (22%)	-8%	<0.01***
		23-25	273 (23%)	282 (24%)	+1%	
		26-30	294 (25%)	347 (29%)	+4%	
		31+	263 (22%)	296 (25%)	+2%	
	BMI	≤ 25	457(39%)	420(36%)	-3%	<0.01***
		26-29	566(49%)	590(51%)	+2%	
		≥ 30	143(12%)	152(13%)	+1%	
	Smoker or Non-Smoker	Non-Smoker	599(51%)	633(54%)	+3%	0.02*
		Smoker	569(49%)	544(46%)	-3%	
Unit Physical Training	Do You Participate in Alternate PT?	No	920(84%)	954(93%)	+9%	<0.01**
		Profile PT	104(9%)	57(6%)	-3%	
		Weight Control PT	33(3%)	13(1%)	-2%	
		Pregnancy PT	----	1(0.1%)	+0.1%	
		Other	44(4%)	6(1%)	-3%	
	Times per month performing Road Marches	No Road Marching	62(6%)	70(6%)	0%	<0.01***
		< 1 time per month	294(27%)	422(38%)	+11%	
		2 times per month	268(24%)	329(30%)	+6%	
		3 times per month	134(12%)	136(12%)	0%	
		4 times per month	342(31%)	151(14%)	-17%	
	Perform Cross-training type of exercises and types of Cross-training performed	No	371 (34%)	266 (24%)	-10%	<0.01*
		Yes[1]	737 (66%)	832 (76%)	+10%	
		Basic Cross-training	622 (56%)	225 (21%)	-35%	<0.01**
		TRX	13 (1%)	15 (1%)	0%	
		P90X	16 (1%)	22 (2%)	+1%	
		Crossfit[2]	----	80 (7%)	----	
		IHPO[2]	----	300 (27%)	----	
		Other	33 (3%)	8 (1%)	-2%	
		One or More Cross-training programs	53 (5%)	182 (17%)	+12%	
	Number of times per week Cross-training performed	No Cross-training	371(34%)	266(24%)	-9%	<0.01***
		< 1 time per wk	109(10%)	81(8%)	-2%	
		1-2 times per wk	376(34%)	338(32%)	-2%	
		3-4 times per wk	163(15%)	239(23%)	+8%	
		> 4 times per wk	86(8%)	138(13%)	+5%	

Table 1. Pre and Post Distribution Percentages of Specific Demographic, Unit and Personal Physical Fitness Training Variables Before and After the Implementation of IHPOP (continued)

Variable	Level of Variable	Level of Variable	Before PRT	After PRT	Difference	p -value
Unit Physical Training	Total Distance Ran per week	< 5 miles per wk	261(24%)	397(38%)	+14%	<0.01***
		5-9 miles per wk	433(40%)	385(37%)	-3%	
		10-19 miles per wk	309(29%)	248(24%)	-5%	
		20 + miles per wk	73(7%)	25(2%)	-5%	
	Times per week of Sprint/Interval Training	No Sprints	52(5%)	31(3%)	-2%	<0.01***
		< 1 time per wk	236(21%)	170(15%)	-6%	
		1-2 times per wk	687(62%)	699(63%)	+1%	
		3-4 times per wk	123(11%)	182(17%)	+6%	
		> 4 times per wk	17(2%)	24(2%)	0%	
	Times per week of Resistance Training	No Resistance	403(37%)	300(27%)	-10%	<0.01***
		< 1 time per wk	267(23%)	292(26%)	+3%	
		1-2 times per wk	349(32%)	378(34%)	+2%	
		3-4 times per wk	72(7%)	124(11%)	+4%	
		>4 times per wk	9(1%)	14(1%)	0%	
	Times per wk of Agility Drills	No Agility Drills	423(38%)	241(22%)	-16%	<0.01***
		< 1 time per wk	292(27%)	264(24%)	-3%	
		1-2 times per wk	285(26%)	397(36%)	+10%	
		3-4 times per wk	85(8%)	168(15%)	+7%	
		>4 times per wk	17(2%)	35(3%)	+1%	
Personal Physical Training	Total Distance ran per week for Personal PT	No Distance Running	337(29%)	336(30%)	+1%	0.99***
		< 5 miles	528(46%)	503(44%)	-2%	
		5-9 miles	173(15%)	198(18%)	+3%	
		10-19 miles	69(6%)	66(6%)	0%	
		≥ 20 miles	36(3%)	31(3%)	0%	
	Times per week of Resistance Training	No Weight Training	364(31%)	338(29%)	-3%	0.35***
		< 1 time per wk	135(12%)	148(13%)	+1%	
		1-2 times per wk	314(27%)	322(28%)	+1%	
		3-4 times per wk	240(21%)	261(22%)	+1%	
		≥ 5 times per wk	111(10%)	102(9%)	-1%	
	Times per week of Sprint/Interval Training	No Sprints	561(48%)	508(43%)	-5%	0.03***
		< 1 time per wk	226(19%)	261(22%)	+3%	
		1-2 times per wk	304(26%)	302(26%)	0%	
		≥ 3 times per wk	82(7%)	99(9%)	+2%	

[1]Composed of the different types of Cross-training programs listed below

* McNemar Test (2x2 only) **The Marginal Homogeneity Test (Nominal Data) *** Wilcoxon Signed Rank Test (Ordinal Data)

6.2 Physical Fitness Performance

Physical fitness performance slightly improved after implementation of IHPOP for muscular endurance (push-ups), and total APFT score, while aerobic fitness decreased (i.e. 2-mile run-times got slower) (Table 2.). Although significant these changes are minimal and not very indicative of improved or decreased performance.

Table 2. Survey Results: Average Physical Fitness Test and BMI Scores for Men (Matched Data)

Variable	n	Before PRT (Mean ± SD)	After PRT (Mean ± SD)	Difference	Paired T-Test (p-value)
2-Mile Run (minutes and fraction of a minutes)	989	14.7±1.61	14.9±1.61	+ 0.2 minutes (+12 seconds)	<0.01
Push-Ups (reps)	1,044	67±14.18	68±14.22	+1	<0.01
Sit-Ups (reps)	1,042	68±12.81	69±12.62	+1	0.38
Total APFT Score (points)	968	251±46.17	255±32.36	+4	<0.01
BMI	1,146	26.0 ±3.47	26.1±3.39	+0.1	<0.01

6.3 Injury Data from Medical Records

Injury rate trends were compared between the entire brigade (men and women), FORSCOM and the U.S. Army during the months IHPOP was being performed in the brigade (excluding Feb for the brigade). Similar trends in injury rates were found between the three groups (p=0.72) (Figure 1).

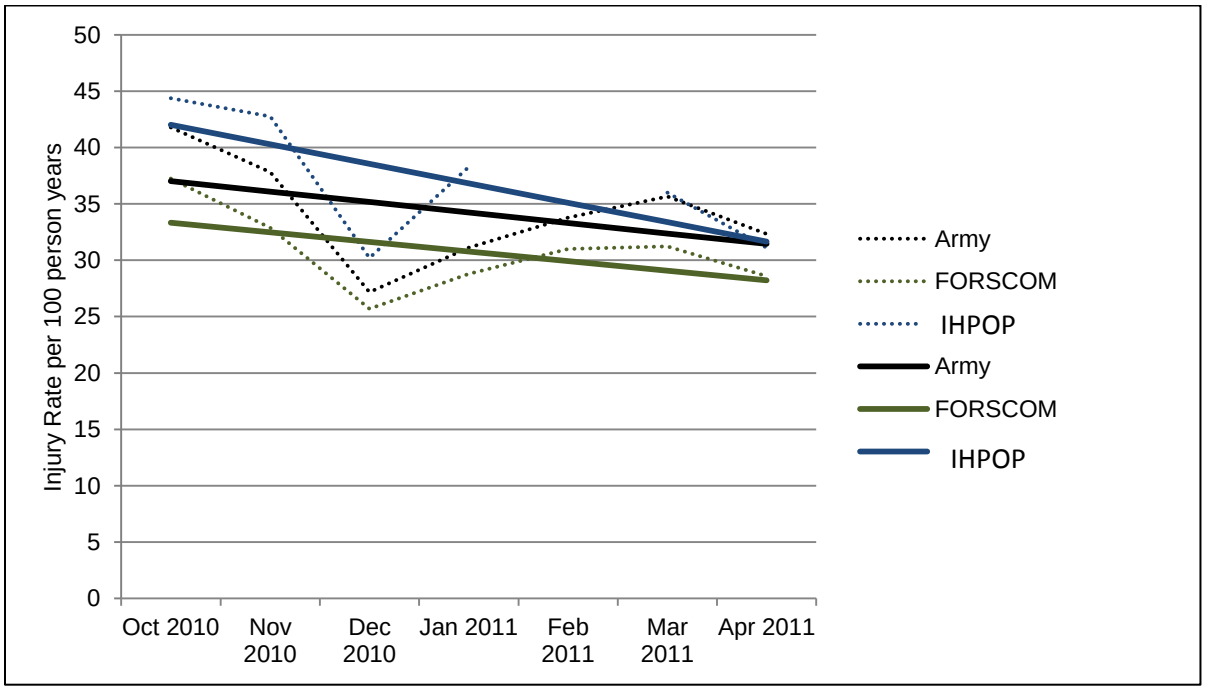

Figure 1. Trends in Army, FORSCOM, and the Brigade Injury Rates during the IHPOP are shown. Regression Coefficients between Month and Injury Rate do not Significantly Differ across the Three Groups (p=0.72)

For a more precise comparison of program effects and injury risk, the continued analysis on injury rates/risk will be on matched men only. When comparing injury rates 7 months before IHPOP and 6 during IHPOP for matched men, overall, overuse and traumatic injury rates remained similar. Injury rates were compared using 7 months before IHPOP and 6 months during IHPOP because the brigade was deployed to Joint Readiness Training Center (JRTC) for 1 month during IHPOP (February) where injury incidence was not fully captured by the medical record system and medical utilization was low because of the lack of opportunity for seeking care (Table 3).

Table 3. Comparison of Injury Incidence Before and After the Implementation of IHPOP for Men as Calculated from Medical Record Data per 1,000 Soldiers per month (Matched) (n=1183)

Injury Type	Average Injury Incidence per 1000/ Soldier months Before PRT	Average Injury Incidence per 1000/ Soldier months After PRT	p-value
Overall	55	57	0.64
Overuse	34	38	0.14
Traumatic	26	31	0.45

Overall injury visits per month are shown in Figure 2. From 1.8% -10% of matched male Soldiers sought medical care for an injury each month from March 2010-April 2011(average of 7% per month).

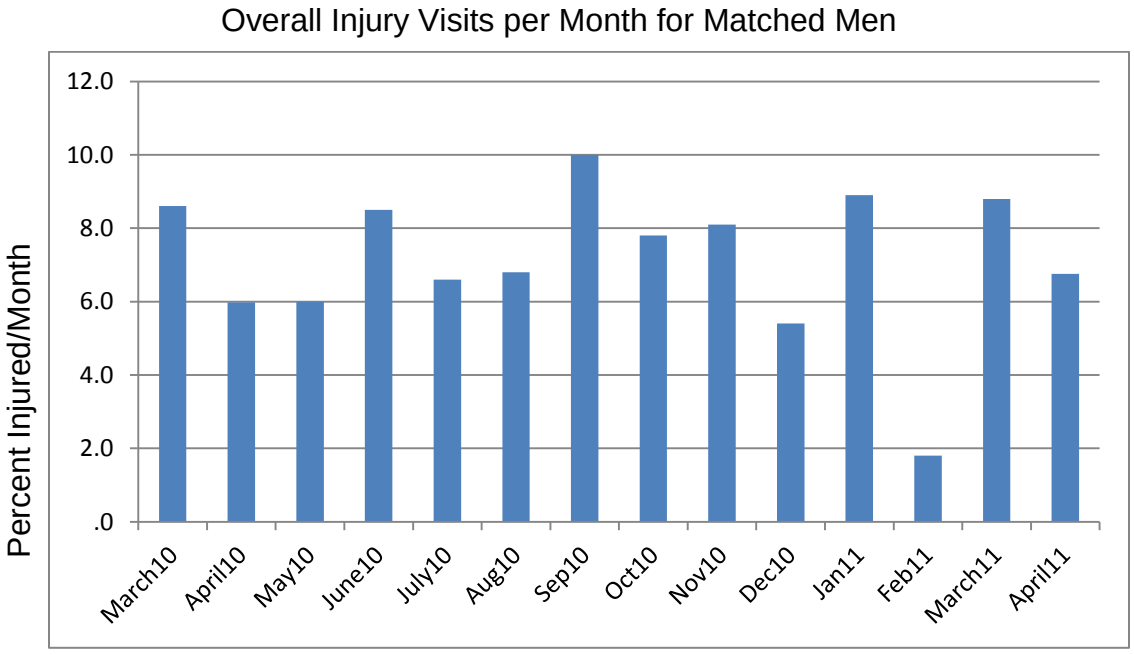

Figure 2. Overall Injury Visits (n=3,138) by Month for Matched Men (n=638). IHPOP was Implemented in October 2010. The Soldiers Deployed to JRTC in February 2011

Figure 3 displays the number of medical visits by selected clinics for matched men before and after the implementation of IHPOP. Injury related primary care / family practice visits decreased by 30% after the implementation of IHPOP.

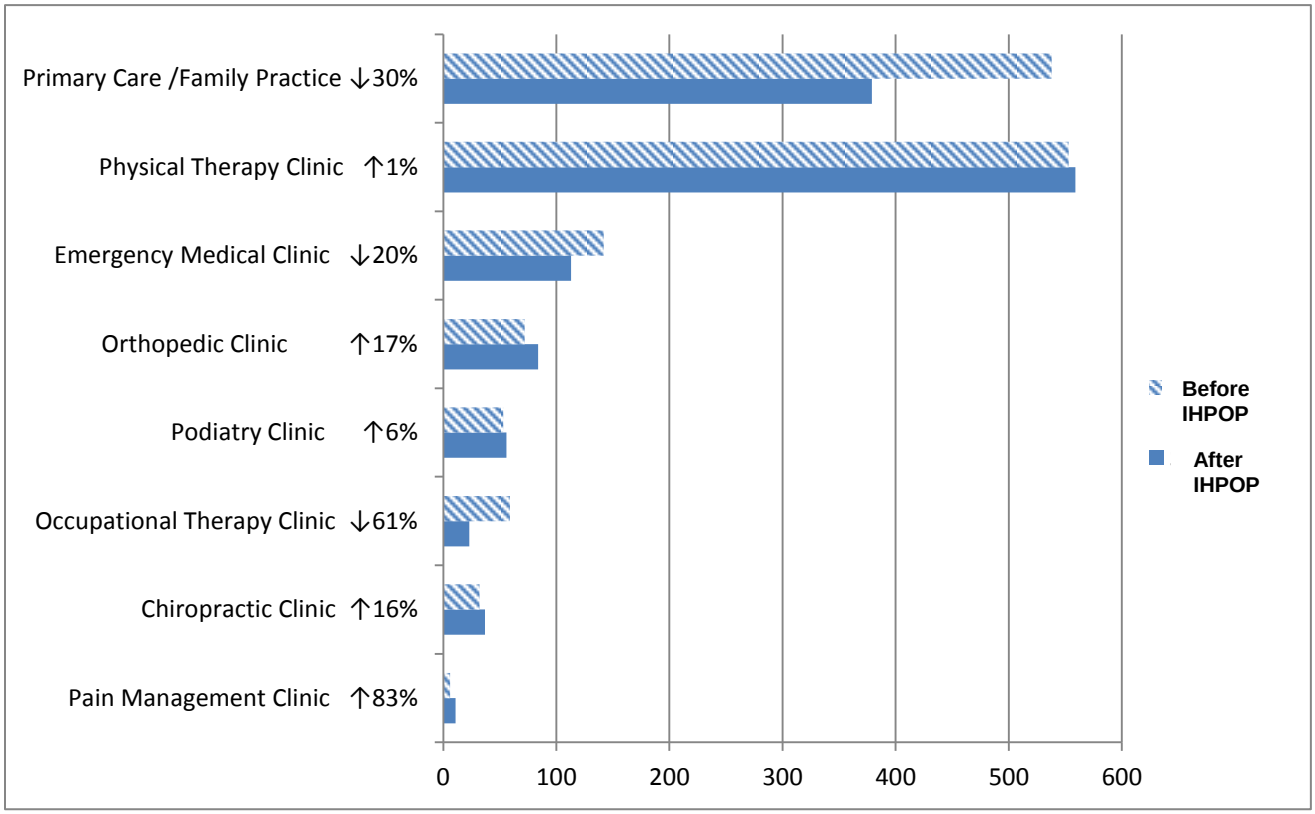

Figure 3. Medical Visits for Overall Injuries Before and After the Implementation of IHPOP for Matched Men by Selected Medical Clinic

6.4 Injury Data from Surveys

The top three types of injuries were strains/sprains, broken/fractured bones and pain (Table 4). Sprain/strains accounted for about a third of the limited duty days (LDDs) before IHPOP and about one half of the limited duty days after the implementation of IHPOP. **The bold text in Table 4 displays average LDDs per month before and after the implementation of IHPOP and the percent change in LDDs per month**.

Table 4. Survey Results: Number of Limited Duty Days by Type of Injury for Matched Men (n=1183) (Those who completed both the Initial and Follow-up Survey)

Variable	n (%) Before IHPOP	n Before IHPOP with reported LLDs	Avg LLDs per Soldier 12 Months Before IHPOP)	n (%) After IHPOP	n After IHPOP with reported LLDs	Avg LLDs per Soldier 6 Months After IHPOP	Total LDDs 12 months Before IHPOP **(Avg LDDs per month)**	Total LDDs 6 months After IHPOP **(Avg LDDs per month)**	**% Change in Avg LLDs per month**
Sprain/Strain	233(52%)	117	29 ± 25	121(48%)	74	42 ± 44	3402 **(284)**	3106 **(518)**	**+ 82%**
Broken/ Fractured bone	46(10%)	35	57 ± 55	21(8%)	18	59 ± 51	2008 **(167)**	1060 **(176)**	**+ 5%**
Pain	41(9%)	21	34 ± 55	36(14%)	16	39 ± 56	706 **(59)**	631 **(105)**	**+ 78%**
Tendonitis or Bursitis	28(6%)	14	73 ± 85	11(4%)	5	44 ± 43	1021 **(85)**	211 **(35)**	**- 59%**
Dislocation	16(4%)	9	55 ± 56	9(4%)	5	35 ± 33	496 **(41)**	176 **(29)**	**- 29%**
Nerve Injury	10(2%)	6	60 ± 66	5(2%)	2	60 ± 42	362 **(30)**	120 **(20)**	**- 33%**
Concussion	13(3%)	9	29 ± 38	3(1%)	1	20	265 **(22)**	20 **(3)**	**- 86%**
Bruise/ Contusion	13(3%)	7	16 ± 10	7(3%)	6	23 ± 21	110 **(9)**	136 **(23)**	**+ 156%**
Cut/Laceration	15(3%)	6	23 ± 23	6(2%)	3	6 ± 2	138 **(12)**	10 **(2)**	**- 83%**
Burn	6(1%)	3	47 ± 46	1(<1%)	----	----	142 **(12)**	----	**----**
Heat and Cold	4(1%)	2	60 ± 42	----	----	----	120 **(10)**	----	**----**
Blister	3(1%)	1	60 ± 0	4(2%)	----	----	60 **(5)**	----	**----**
Scrap/ Abrasion	4(1%)	----	-----	2(1%)	----	----	----	----	**----**
Other	20(4%)	14	54 ± 48	25(10%)	17	49 ± 40	750 **(63)**	836 **(139)**	**+ 121%**
Total	452	244		251	147		9580 **(798)**	6306 **(1051)**	**+32%**

Lower extremity injuries (Leg/Knee/Shin/Ankle/Foot) accounted for approximately half of all the LDDs before IHPO and about two thirds of all LDDs after the implementation of IHPOP (Table 5). Approximately 61% of the lower extremity injuries both before and after the implementation of IHPOP were attributed to sprains/strains. **The bold text in Table 5 displays average LDDs per month before and after the implementation of IHPOP and the percent change in LDDs per month.**

Table 5. Survey Results: Number of Limited Duty Days by Injured Body Area for Matched Men (n=1183) (Those who completed both the Initial and Follow-up Survey)

Variable	n (%) Before IHPOP	n Before IHPOP with reported LLDs	Avg LLDs per Soldier 12 Months Before IHPOP	n (%) After IHPOP	n After IHPOP with reported LLDs	Avg LLDs per Soldier 6 Months After IHPOP	Total LDDs 12 months Before IHPOP **(Avg LDDs per month)**	Total LDDs 6 months After IHPOP **(Avg LDDs per month)**	**% Change in Avg LLDs per month**
Leg/Knee/Shin / Ankle/Foot	215(48%)	120	37 ± 39	129(51%)	82	49 ± 52	4477 **(373)**	4016 **(669)**	**+ 79%**
Upper Back/Shoulder /Lower Back	86(19%)	47	47 ± 47	62(25%)	39	38 ± 33	2195 **(183)**	1490 **(248)**	**+ 36%**
Arm/Elbow/ Wrist/Hand	41(9%)	19	55 ± 55	26(10%)	11	34 ± 33	1036 **(86)**	372 **(62)**	**- 29%**
Upper and Lower Body	64(14%)	30	28 ± 25	2(1%)	1	7	830 **(69)**	7 **(1)**	**- 99%**
Chest/ Abdominal Area	13(3%)	9	39 ± 65	11(4%)	6	26 ± 6	347 **(29)**	156 **(26)**	**- 10%**
Head/Face/ Neck	16(4%)	10	45 ± 55	10(4%)	1	20	448 **(37)**	20 **(3)**	**- 9%**
Hip/Pelvic Area	15(3%)	7	30 ± 34	12(5%)	7	36 ± 29	210 **(18)**	252 **(42)**	**+ 133%**
Other	1(<1%)	1	30	----	----	----	30 **(3)**	----	**----**
Total	451	243		252	147		9460 **(788)**	6285 **(1048)**	**+ 33%**

Physical activity accounted for about half of all the LDDs before the implementation of IHPOP and about two thirds of the LDDs after the implementation of IHPOP (Table 6). Running injuries were the most common physical activity associated with injury and accounted for 22% of the injuries before the implementation of IHPOP and 30% of the injuries after the implementation of IHPOP. **The bold text in Table 6 displays average LDDs per month before and after the implementation of IHPOP and the percent change in LDDs per month.**

Table 6. Survey Results: Number of Limited Duty Days by Activity for Matched Men (n=1183) (Those who completed both the Initial and Follow-up Survey)

Variable	n (%) Before IHPOP	n Before IHPOP with reported LLDs	Avg LLDs per Soldier 12 Months Before IHPOP	n (%) After IHPOP	n After IHPOP with reported LLDs	Avg LLDs per Soldier 6 Months After IHPOP	Total LDDs 12 months Before IHPOP **(Avg LDDs per month)**	Total LDDs 6 months After IHPOP **(Avg LDDs per month)**	**% Change in Avg LLDs per month**
Running	94(22%)	55	32 ± 26	69(30%)	41	44 ± 46	1751 **(146)**	1822 **(303)**	**+ 108%**
Walking/Hiking/ Marching	59(14%)	20	35 ± 47	39(17%)	22	69 ± 58	693 **(58)**	1509 **(252)**	**+ 334%**
Lifting/Moving Heavy Objects	38(9%)	24	43 ± 66	32(14%)	18	36 ± 41	1041 **(87)**	641 **(107)**	**+ 23%**
Sports	53(12%)	27	39 ± 44	16(7%)	10	49 ± 42	1061 **(88)**	487 **(81)**	**- 8%**
Exercising	63(14%)	35	40 ± 44	19(8%)	9	25 ± 26	1399 **(117)**	227 **(38)**	**- 68%**
Motor Vehicle	26(6%)	16	46 ± 38	8(3%)	6	41 ± 41	728 **(61)**	248 **(1)**	**- 33%**
Stepping/ Climbing	18(4%)	12	56 ± 51	12(5%)	7	38 ± 31	672 **(56)**	269 **(45)**	**- 20%**
Repairing equipment	22(5%)	10	40 ± 51	13(6%)	8	20 ± 23	402 **(34)**	163 **(27)**	**- 21%**
Other	64(15%)	37	43 ± 51	26(11%)	14	47 ± 47	1600 **(133)**	652 **(109)**	**- 18%**
Total	437	236		234	135		9347 **(779)**	6018 **(1003)**	**+ 29%**

There was a total of 9580 LDD 12 months before the implementation of IHPOP and a total of 6,327 days of LDD during the 6 months of IHPOP. The average number of limited duty days per month increased from an average of 798 (9580/12) days per month before the implementation of IHPOP to an average of 1,055 (6327/6) days per month after the implementation of IHPOP, a 32% increase (Table 8). The increase was primarily attributed to more limited duty days given after the implementation of IHPOP for strains and sprains. The average number of LDDs for strains/sprains per Soldier was 29 days before the implementation of IHPOP and 42 days after the implementation of IHPOP. When strains/sprains are excluded the average number of limited duty days per month only increases by 4% (Table 7).

Table 7. Survey Results: Self-Reported Limited Duty Days (LDD) for Matched Men

Subjects	**12 months before IHPOP**	**6 months after IHPOP**	**12 months before IHPOP**	**6 months after IHPOP**	**Before IHPOP**	**During IHPOP**	
	n with LDD	**n with LDD**	**Mean LDD**	**Mean LDD**	**Average LDD per month**	**Average LDD per month**	**% Average Change in LDD per month**
Matched men	244	148	39 ± 45	43 ± 44	798	1,055	+ 32%
Matched men excluding strains and sprains	127	74	49 ± 55	44 ± 45	515	537	+ 4%

6.5 Injury Risk Factors

Univariate analysis was performed to evaluate risk factors associated with demographics, unit physical training, personal fitness and physical performance for all men who participated in IHPOP. Additional analysis for injury risk factors on medical occupational specialty, physical demand level, tobacco use and dietary habits/supplement use can be found in section 6 of Appendix B.

Table 8 displays demographic injury risk factors for men and women in the gender category only. When compared to men, women had a 38% higher risk of injury. For men, those with higher BMI's, lower rank, less education, were married and in the 1-10 CAV had a higher risk of injury. For ethnicity, Asian's had a lower risk of injury when compared to Caucasians.

Table 8. Survey Results: Demographic Injury Risk Factors for Men after the Implementation of IHPOP (Women are only included in the Gender category)

Variable	Subcategory of Variable	N	% Injured	Risk Ratio (95%CI)	p-value
Gender	Men	2400	34%	1.00	
	Women	135	47%	1.38 (1.15-1.66)	<0.01
Age	18-22 years	663	32%	1.00	
	23-25 years	550	34%	1.06 (0.91-1.25)	0.45
	26-30 years	624	35%	1.09 (0.93-1.27)	0.29
	31+ years	563	37%	1.14 (0.98-1.33)	0.10
BMI	<25	861	32%	1.00	
	25-29.9	1177	34%	1.05 (0.93-1.19)	0.43
	≥30	298	43%	1.33 (1.13-1.56)	<0.01
Rank	E1-E3	800	33%	1.19 (0.86-1.65)	0.28
	E4-E6	1315	37%	1.35 (0.98-1.85)	0.05
	E7-E9	106	27%	1.00	
	O1-O3	139	27%	1.00 (0.66-1.51)	0.99
	O4-O6	21	29%	1.04 (0.50-2.20)	0.91
	W1-W3	19	37%	1.35 (0.69-2.62)	0.40
Race	Caucasian	1682	35%	1.00	
	Asian	103	23%	0.67 (0.47-0.96)	0.02
	Black	269	37%	1.08 (0.91-1.27)	0.40
	Hispanic	304	34%	0.98 (0.83-1.16)	0.82
	American Indian	31	42%	1.21 (0.80-1.85)	0.39
Education Level	No High School	31	45%	1.70 (1.07-2.69)	0.04
	High School	1958	35%	1.30 (1.01-1.68)	0.03
	Some College	172	39%	1.47 (1.07-2.00)	0.01
	Bachelors	173	27%	1.00	
	Masters	25	32%	1.20 (0.65-2.24)	0.57
	Doctorate	7	43%	1.61 (0.66-3.93)	0.38*
Marital Status	Single	968	31%	1.00	
	Married	1338	37%	1.20 (1.07-1.35)	<0.01
	Other (Separated/Divorced/Widowed)	94	35%	1.14 (0.85-1.53)	0.39
Battalion	3-16 FA	279	29%	1.00	
	1-10 CAV	372	42%	1.45 (1.17-1.81)	<0.01
	1-67 AR	443	32%	1.09 (0.87-1.37)	0.47
	2-8 IN	666	35%	1.19 (0.96-1.47)	0.10
	204 BSB	234	34%	1.18 (0.91-1.52)	0.21
	2-4 STB	396	33%	1.14 (0.90-1.44)	0.27

* Fisher exact test used due to at least one cell count ≤ 5

Table 9 displays injury risk factors for unit physical training after the implementation of IHPOP. Soldiers who did not participate in unit PT, were on profile PT or the weight control program, performed no cross-training (marginally significant) or distance running were at a higher risk of injury. Soldiers who performed agility training 1-4 times per week and road marched 1-3 times per week were at a lower risk of injury than Soldiers who did not perform agility training or road marching.

Table 9. Survey Results: Injury Risk Factors for Unit Physical Training After the Implementation of IHPOP for Men

Variable	Level of Variable	N	% Injured	Risk Ratio (95%CI)	p -value
Participate in Unit PT	No	129	56%	1.68 (1.43-1.99)	<0.01
	Yes	2269	33%	1.00	
How Often Participate in Unit PT	< 5 times a wk	448	33%	1.00	
	5-7 times a wk	1692	33%	1.00 (0.86-1.15)	0.95
	>7 times a wk	86	33%	0.98 (0.70-1.36)	0.90
Do You Participate in Alternate PT?	No	2038	31%	1.00	
	Profile PT	122	64%	2.07 (1.78-2.40)	<0.01
	Weight Control PT	27	52%	1.68 (1.16-2.43)	0.02
	Other	14	36%	1.16 (0.57-2.34)	0.70
Perform Cross-training type of exercises and types of Cross-training performed	No	622	36%	1.14 (0.96-1.36)	0.12
	Basic Cross-training	474	31%	1.00	
	TRX	24	33%	1.07 (0.60-1.91)	0.83
	P90X	62	36%	1.14 (0.79-1.63)	0.50
	Crossfit[2]	147	33%	1.07 (0.82-1.39)	0.63
	IHPO[2]	546	30%	0.97 (0.80-1.16)	0.73
	Other	20	40%	1.28 (0.74-2.23)	0.41
	One or More Cross-training programs	310	33%	1.06 (0.87-1.309)	0.56
Number of times per week Cross-training performed	No Cross-training	622	36%	1.16 (1.00-1.36)	0.06
	< 1 time per wk	162	36%	1.19 (0.94-1.50)	0.16
	1-2 times per wk	674	31%	1.00	
	3-4 times per wk	429	32%	1.04 (0.87-1.24)	0.67
	> 4 times per wk	250	34%	1.11 (0.90-1.36)	0.34
Times per wk of Distance Running	No distance running	38	53%	1.00	
	< 1 time per wk	121	28%	0.53 (0.35-0.81)	<0.01
	1-2 times per wk	1051	33%	0.62 (0.45-0.84)	<0.01
	3-4 times per wk	888	35%	0.66 (0.48-0.90)	<0.01
	> 4 times per wk	115	24%	0.45 (0.29-0.70)	<0.01
Distance ran per time run	No distance running	38	53%	2.00 (1.09-3.69)	0.02
	1 mile	38	26%	1.00	
	2-3 miles	1145	32%	1.22 (0.71-2.09)	0.46
	≥ 4 miles	295	32%	1.21 (0.70-2.07)	0.48
Total Distance Ran per wk	< 5 miles per wk	730	32%	1.00	
	5-9 miles per wk	824	31%	0.98 (0.84-1.13)	0.77
	10-19 miles per wk	491	34%	1.06 (0.90-1.25)	0.47
	20 + miles per wk	65	32%	1.02 (0.71-1.48)	0.91

Table 9. Survey Results: Injury Risk Factors for Unit Physical Training After the Implementation of IHPOP for Men (continued)

Variable	Level of Variable	N	% Injured	Risk Ratio (95%CI)	p -value
Times per wk of Sprint/Interval Training	No Sprints	63	43%	1.00	
	< 1 time per wk	305	34%	0.79 (0.57-1.09)	0.17
	1-2 times per wk	1416	33%	0.76 (0.57-1.02)	0.09
	3-4 times per wk	379	31%	0.73 (0.53-1.00)	0.07
	> 4 times per wk	55	38%	0.89 (0.57-1.39)	0.61
Times per wk of Calisthenics	No Calisthenics	75	36%	1.00	
	< 1 time per wk	210	34%	0.94 (0.66-1.34)	0.73
	1-2 times per wk	828	33%	0.92 (0.67-1.26)	0.61
	3-4 times per wk	648	32%	0.88 (0.64-1.22)	0.46
	> 4 times per wk	459	33%	0.93 (0.67-1.29)	0.65
Times per wk of Resistance Training	No Resistance	677	33%	1.00	
	< 1 time per wk	578	33%	1.02 (0.87-1.19)	0.82
	1-2 times per wk	694	34%	1.02 (0.88-1.19)	0.76
	3-4 times per wk	234	29%	0.89 (0.71-1.11)	0.29
	>4 times per wk	39	41%	1.25 (0.85-1.85)	0.29
Times per wk of Agility Drills	No Agility Drills	551	38%	1.00	
	< 1 time per wk	514	35%	0.91 (0.78-1.07)	0.26
	1-2 times per wk	782	30%	0.79 (0.68-0.92)	<0.01
	3-4 times per wk	299	28%	0.74 (0.60-0.91)	<0.01
	>4 times per wk	71	32%	0.85 (0.60-1.22)	0.36
Times per month performing Road Marches	No Road Marching	197	41%	1.00	
	< 1 time per month	824	31%	0.75 (0.61-0.91)	<0.01
	2 times per month	626	31%	0.75 (0.61-0.92)	<0.01
	3 times per month	281	32%	0.79 (0.62-1.00)	0.05
	4 times per month	292	39%	0.94 (0.75-1.17)	0.59
Weight of Load carried while Road Marching	No Road Marching	197	41%	1.00	
	0-15 lbs	57	28%	0.68 (0.44-1.07)	0.07
	16-30 lbs	404	33%	0.81 (0.65-1.00)	0.06
	31-50 lbs	1292	32%	0.77 (0.64-0.92)	<0.01
	> 50 lbs	210	33%	0.81 (0.63-1.05)	0.10
Distance Road Marched	No Road Marching	197	41%	1.00	
	1-3 miles	299	32%	0.79 (0.62-1.00)	0.05
	4-6 miles	1244	32%	0.78 (0.64-0.93)	0.01
	7-10 miles	354	35%	0.85 (0.68-1.06)	0.16
	> 10 miles	58	19%	0.26 (0.26-0.81)	<0.01
Times per wk running while wearing body armor	No Body Armor	1193	34%	1.00	
	< 1 time per wk	690	32%	0.94 (0.82-1.08)	0.40
	1-2 times per wk	238	33%	0.98 (0.80-1.19)	0.80
	≥ 3 times per wk	57	33%	0.99 (0.68-1.44)	0.97
Distance run per wk while wearing body armor	No Body Armor	1193	34%	1.00	
	0-1 mile	352	32%	0.94 (0.79-1.12)	0.47
	2-3 miles	455	32%	0.95 (0.82-1.12)	0.56
	> 3 miles	78	26%	0.76 (0.52-1.12)	0.15

Table 9. Survey Results: Injury Risk Factors for Unit Physical Training After the Implementation of IHPOP for Men (continued)

Variable	Level of Variable	N	% Injured	Risk Ratio (95%CI)	p -value
Times per wk exercising in the swimming pool	No swimming	1779	33%	1.00	
	< 1 time per month	235	32%	0.96 (0.78-1.17)	0.65
	1-2 times per month	39	32%	0.97 (0.74-1.26)	0.79
	≥ 3 times per month	58	26%	0.77 (0.50-1.20)	0.23
Times per month training for the APFT	No APFT training	381	37%	1.00	
	< 1 time per month	382	33%	0.89 (0.73-1.07)	0.22
	1-2 times per month	708	34%	0.91 (0.77-1.08)	0.29
	3-4 times per month	456	27%	0.74 (0.60-0.90)	<0.01
	≥ 5 times per month	291	33%	0.88 (0.71-1.08)	0.21
Do you lead PT for your squad or platoon	No	1439	33%	1.00	
	Yes	790	33%	0.98 (0.87-1.11)	0.77

Table 10 displays injury risk factors for personal physical training after the implementation of IHPOP. Soldiers who ran 1-4 times per week between 2-5 miles per exercise event and less than 10 miles per week, and performed sprint training <1 time per week or 3 or more times per week had a lower risk of injury.

Table 10 Survey Results: Injury Risk Factors for Personal Physical Fitness Training after the Implementation of IHPO for Men

Variable	Level of Variable	N	% Injured	Risk Ratio (95%CI)	p -value
Perform Personal PT	No	373	37%	1.09 (0.95-1.27)	0.24
	Yes	2022	34%	1.00	
Times per wk of Distance Running	No Distance Running	638	38%	1.00	
	< 1 time per wk	429	33%	0.87 (0.74-1.03)	0.11
	1-2 times per wk	852	33%	0.86 (0.75-0.98)	0.03
	3-4 times per wk	353	32%	0.84 (0.70-1.00)	0.05
	≥ 5 times per wk	96	40%	1.04 (0.80-1.36)	0.76
How far did you run when performing distance running	No Distance Running	638	38%	1.00	
	1 mile	201	42%	1.10 (0.91-1.33)	0.33
	2-3 miles	1099	31%	0.83 (0.72-0.94)	<0.01
	4-5 miles	317	29%	0.76 (0.62-0.92)	<0.01
	≥ 6 miles	72	38%	0.99 (0.72-1.35)	0.94
Total Distance ran per wk for Personal PT	No Distance Running	638	38%	1.00	
	< 5 miles	1078	33%	0.86 (0.76-0.98)	0.03
	5-9 miles	374	30%	0.79 (0.66-0.95)	0.01
	10-19 miles	131	31%	0.83 (0.63-1.08)	0.15
	≥ 20 miles	79	37%	0.97 (0.71-1.31)	0.83

Table 10 Survey Results: Injury Risk Factors for Personal Physical Fitness Training after the Implementation of IHPO for Men (continued)

Variable	Level of Variable	N	% Injured	Risk Ratio (95%CI)	p -value
Total Distance ran per wk for Unit and Personal PT	1-9 miles	1115	34%	0.92 (0.66-1.28)	0.62
	10-19 miles	838	31%	0.83 (0.60-1.16)	0.30
	20-29 miles	246	34%	0.92 (0.64-1.33)	0.68
	30 + miles	65	37%	1.00	
Times per wk of Resistance Training	No Weight Training	659	36%	1.00	
	< 1 time per wk	303	33%	0.92 (0.76-1.12)	0.40
	1-2 times per wk	685	34%	0.94 (0.81-1.09)	0.42
	3-4 times per wk	526	35%	0.99 (0.85-1.15)	0.87
	≥ 5 times per wk	204	30%	0.85 (0.67-1.07)	0.16
Times per week of Sprint Training	No Sprints	994	37%	1.00	
	< 1 time per wk	515	31%	0.85 (0.73-0.99)	0.03
	1-2 times per wk	645	35%	0.94 (0.82-1.08)	0.38
	≥ 3 times per wk	220	29%	0.79 (0.63-0.99)	0.03
Personal PT based on	No specific personal training program	372	37%	1.00	
	Traditional PT	134	33%	0.90 (0.74-1.09)	0.29
	Cross-training/ECP	276	34%	0.92 (0.78-1.08)	0.29
	Other	63	33%	0.91 (0.71-1.15)	0.41

Table 11 displays injury risk factors for physical fitness after the implementation of IHPOP. Soldiers who performed poorly on the 2-mile run and push-ups (marginally significant) had a higher risk of injury.

Table 11. Survey Results: APFT Self-Reported Scores and Injury Risk for Men after the implementation of IHPOP

Variable	Variable Level	N	%Injury (After PRT)	Risk Ratio (95% CI)	p-value
2-Mile Run (minutes and Fraction of a minute)	≤ 13.75 min	503	30%	1.00	
	13.76-14.67 min	526	31%	1.02 (0.85-1.22)	0.84
	14.68-15.75 min	554	33%	1.10 (0.92-1.31	0.31
	15.76+ min	517	39%	1.29 (1.08-1.52)	<0.01
Push-Ups	≤ 55reps	531	38%	1.17 (0.99-1.38)	0.06
	56-66 reps	538	36%	1.10 (0.93-1.30)	0.29
	67-76 reps	590	31%	0.94 (0.79-1.12)	0.50
	77+ reps	528	33%	1.00	
Sit-Ups	≤ 60 reps	636	38%	1.07 (0.92-1.24)	0.38
	61-68 reps	514	34%	0.97 (0.82-1.14)	0.71
	69-76 reps	477	28%	0.80 (0.66-0.95)	0.01
	77+ reps	561	35%	1.00	

Multivariable statistical analyses were conducted to independently evaluate risk factors associated with unit and personal physical training activities for men who participated in IHPOP.
Table 12 shows the effects of unit physical training activities on injury risk. The following variables were chosen: number of times cross-training performed per week, times per month road marching, 2-mile run time, smoking status, battalion, and rank. All of the variables remained in the backward stepping model, expect for rank. Multivariate analysis indicated that Soldiers who road marched two to three times per month were at a lower risk of injury than Soldiers who did not perform any road marching with their unit. Soldiers who had slow 2-mile run times, smoked cigarettes and were in the 1-10 CAV were at significantly higher risk of injury. A second multivariate analysis was performed with BMI replacing 2-mile run, due to the relationship between the two variables. As run times increases so does the average BMI (≤ 13.75 min / BMI 24.4 ± 2.9), (13.76-14.67 min / BMI 25.2 ± 2.9). (14.68 - 15.75 min / BMI 26.2 ± 3.3), (15.76 + min / BMI 27.6 ± 3.5) (ANOVA $p < 0.01$). Therefore these two variables compete with each other in the multivariate analysis and cannot be run in the same model together. Replacing 2-mile run with BMI produces similar multivariate outcomes and an increased injury risk for those with a BMI ≥ 30 compared to Soldiers with a BMI ≤ 25 (OR (≥30BMI/≤ 25BMI) =1.75, 95%CI: 1.30-2.36) (data not shown in Table).

Table 12. Backward Stepping Multivariate Logistic Regression: Injury Risk Factors for Unit PT for Men (Follow-up Survey)

Variable	Variable Level	n	OR (95% CI)	p-value
Number of times per week Cross-training performed	No Cross-training	526	1.00	
	< 1 time per wk	144	1.28 (0.90-1.82)	0.17
	1-2 times per wk	578	1.50 (0.95-2.36)	0.08
	3-4 times per wk	385	0.89 (0.63-1.26)	0.49
	> 4 times per wk	216	1.07 (0.74-1.55)	0.71
Times per month performing Road Marches	No Road Marching	155	1.00	
	< 1 time per month	669	0.78 (0.50-1.22)	0.27
	2 times per month	540	0.55 (0.39-0.75)	<0.01
	3 times per month	244	0.61 (0.44-0.85)	<0.01
	4 times per month	241	0.77 (0.53-1.13)	0.18
2-Mile Run (minutes and Fraction of a minute)	≤ 13.75 min	447	1.00	
	13.76-14.67 min	445	0.95 (0.71-1.28)	0.74
	14.68-15.75 min	492	1.07 (0.81-1.43)	0.63
	15.76+ min	465	1.39 (1.04-1.84)	0.03
Smoker or Non-Smoker	Non-Smoker	1040	1.00	
	Smoker	809	1.35 (1.11-1.65)	<0.01
Battalion	3-16 FA	216	1.00	
	1-10 CAV	301	1.90 (1.29-2.79)	<0.01
	2-4 STB	287	1.23 (0.83-1.83)	0.31
	2-8 IN	540	1.20 (0.84-1.71)	0.32
	204 BSB	155	1.16 (0.73-1.85)	0.53
	1-67 AR	350	1.01 (0.69-1.48)	0.95

Table 13 shows the effects of personal physical training activities on injury risk. The following variables were chosen: smoker status, BMI, battalion, total distance ran per week for personal PT, rank, and sprint training per week for personal PT. All of the variables remained in the backward stepping model, expect for rank and sprint training per week for personal PT. Analysis indicated that Soldiers who ran between approximately 5-9 miles per week were less likely to be injured compared to Soldiers who ran 20 + miles per week. The effects of BMI, smoking and battalion were controlled for in the multivariate analysis. Soldiers who were considered obese (≥ 30), smoked cigarettes and were in the 1-10 CAV were at significantly higher risk of injury. A second multivariate analysis was performed with 2-mile run times replacing BMI and total distance ran per week for personal PT, due to the relationship between these variables. The more miles run per week during personal PT, the faster the average 2-mile run times. Replacing 2-mile run time with BMI produced similar multivariate outcomes and an increased injury risk for those with the slowest run times comparing to Soldiers with the fastest run times (OR (Slowest Run Times/ Fastest Run Times) =1.46, 95%CI: 1.12-1.91) (data not shown in table).

Table 13. Backward Stepping Multivariate Logistic Regression: Injury Risk Factors for Personal PT for Men (Follow-up) (without 2-mile run)

Variable	Variable Level	n	OR (95% CI)	p-value
Smoker or Non-Smoker	Non-Smoker	1230	1.00	
	Smoker	962	1.31 (1.09-1.57)	<0.01
BMI	<25	808	1.00	
	25-29.9	1102	1.10 (0.90-1.33)	0.36
	≥30	282	1.68 (1.26-2.23)	<0.01
Battalion	3-16 FA	255	1.00	
	1-10 CAV	337	1.87 (1.31-2.65)	<0.01
	1-67 AR	397	1.18 (0.83-1.67)	0.35
	2-8 IN	622	1.32 (0.96-1.82)	0.09
	204 BSB	216	1.25 (0.84-1.86)	0.26
	2-4 STB	365	1.27 (0.89-1.81)	0.18
Total Distance ran per week for Personal PT	No Distance Running	600	0.83 (0.51-1.39)	0.49
	< 5 miles	1036	0.67 (0.41-1.09)	0.11
	5-9 miles	356	0.59 (0.35-0.99)	0.05
	10-19 miles	126	0.68 (0.37-*1.24)	0.20
	≥ 20 miles	74	1.00	

7 Discussion

Injury rates remained similar before and after the implementation of IHPOP, while limited duty days increased by 32%. The most common type of injuries were sprains/strains of the lower extremities attributed to physical activity. Physical fitness performance slightly improved after implementation of IHPOP for muscular endurance (push-ups) and total APFT score. Although significant these changes are minimal and not very indicative of improved performance. The amount of long distance running and road marching decreased after the implementation of IHPOP and were replaced with cross-training, agility training and sprint training. Soldiers who had poor performance on the 2-mile run, were smokers, obese or ran ≥ 20 miles per week for personal PT were at a higher risk of injury.

7.1 Injury and Injury Rates

After the implementation of IHPOP (which is based on guidelines from the U.S. Army PRT manual), injury rates remained similar with the exclusion of February (the brigade was deployed to JTRC). Other studies performed in basic training[5 6] and advanced individual training[7] have shown that PRT reduced injuries when compared to traditional Army physical training consisting primarily of warm-up and stretching exercises followed by calisthenics, push-ups, sit-ups, some sprint training, and group long distance running. However, unlike these previous studies the current study consisted of active duty infantry Soldiers followed for an extended period of time before and after the implementation of a new exercise program.

Only one other investigation of MATs has been performed. In this investigation the effects of a MAT (responsible for 3 battalions) was studied. Injury rates were compared one year before the MAT was in place and 8 months after the MAT was in place. The authors found that injury rates decreased with the addition of the MAT for all 3 battalions.[8] However as noted earlier, unlike the current investigation these were not the same Soldiers before and after the implementation of the MAT, but rather different groups of Soldiers going through initial entry training. Because the MAT and a new fitness program were implemented together in this study, a longer evaluation period may be needed to demonstrate any positive effects of a new fitness program and the addition of a MAT on injury incidence.

The most common type of injuries occurring before and after the implementation of IHPOP was sprains/strains of the lower the extremities. Other military investigations have also noted sprains/strains of the lower extremities as the most frequent type of injury.[9 10 11] The most common cause of injury was physical activity and sports (64%) with running accounting for 34% of these injuries (Appendix B Table 3.3). This is consistent with other military studies showing that running accounts for about 30% of the injuries [9] and the that majority of injuries occurring in Army Soldiers are attributed to physical fitness and sports.[9 12-15]

7.2 Limited Duty Days

Limited duty days increased after the implementation of IHPOP by an average of 32% per month. This can be attributed to the additional 13 days on average of limited duty given for sprain/strains. Although limited duty days increased, the percentage of Soldiers experiencing sprains/strains (approximately 50%) remained the same before and after the implementation of IHPOP. The most common types of injuries leading to the most limited duty days were sprain/strains, fractures, and pain. Consistent with these findings, a study investigating injuries and limited duty days in the military also indicated that the most common types of injuries with the greatest amount of limited duty days are overuse pain, fractures and sprain/strains.[11] Other investigations comparable to this study (investigating the effects of a MAT and limited duty days), examined the implementation of athletic trainers or athletic trainer like programs and lost workdays as related to injury.[16-19] These athletic training like programs have shown a more rapid return to work[16] and a reduction in lost work days, [16, 18] and that in-house athletic training or athletic training like programs can be cost effective compared to outsourcing medical care.[17] In the current study it is possible that the MAT had more experience working with athletic injuries, provided easier access to care and continued with each patient until they were at 100% recovery, which may have required more limited duty days than previous treatment before the MAT. The MAT also specifically worked with this brigade and most likely formed good relationships with these Soldiers, as well as, obtaining leadership support, having some ability to enforce profiles since they are embedded in the brigade, and providing the education needed to be successful during their recovery process.

Before the implementation of IHPOP and the MAT other factors may have influenced the number of limited duty days. In a U.S. Army study investigating musculoskeletal injuries, Soldiers concerns about the healthcare system and leadership included hassles related to outpatient appointments, numerous healthcare providers involved in the Soldiers' care, being rushed through the healthcare system, and that providers were making judgments about whether injuries were legitimate. Soldiers also felt pressure from unit leaders and peers to perform their duties regardless of physical limitations. They felt the need to "drive on" and pull their own weight.[20] These concerns suggest that Soldiers may tend to return to work sooner, not allowing for sufficient recovery time. It appears that the presence of a MAT may address a number of these concerns.

7.3 Physical Training

With the implementation of IHPOP, the amount of long distance running and road marching decreased. Although injury rates remained similar, APFT scores for muscular endurance and total fitness scores slightly improved while cardiovascular endurance slightly decreased. However the changes in fitness, even though significant are fairly minimal, so it might be more accurate to say that fitness was maintained during IHPOP. Previous military studies investigating the effects of a new exercise program and physical performance have shown higher or similar physical fitness performance after completing a new exercise program.[5 6 7 21 22] These previous exercise programs are all similar to IHPOP in that they performed less running mileage per week compared to their previous exercise program and replaced the time spent running with other activities such as agility, resistance and/or interval/ sprint training. Previous studies have shown similar performance on the 2-mile run test between Soldiers in high and low mileage groups,[2, 23] indicating that additional mileage run per week had no added benefits on aerobic endurance.

As mentioned, cross-training, agility training and sprint training increased after the implementation of IHPOP. Some of the cross-training, agility and sprint training exercises performed could be classified as high intensity interval training (HIIT). HIIT can be broadly defined as short to moderate bouts of exercise (10 seconds to 5 minutes) performed at intensities greater than the anaerobic threshold.[24] Previous research has shown that high intensity interval training improves aerobic capacity.[25 26, 27] In a recent meta-analysis investigating sprint interval training and the effects on aerobic capacity, an aggregate improvement of approximately 8% increase in aerobic capacity was shown when compared to no-exercise control groups and no difference was shown when compared to the endurance training control groups. The authors concluded that relative to continuous moderate endurance training, sprint interval training is an equally effective alternative for improving aerobic capacity in healthy young people with the added benefit of a decreased volume of activity.[27] In another study investigating high intensity interval training in sedentary and recreational athletes, a 44% average increase in VO2 max was found after 10 weeks of HIIT.[26] Even though HIIT has the ability to increase VO2 max, there needs to be a balance of muscular endurance, aerobic and anaerobic capacity achieved through long distance running and HIIT. In a study investigating infantry Soldiers and extreme conditioning programs, the aerobic capacity of Soldiers running less than 16 miles per week combined with HIIT was similar to Soldiers running greater than 16 miles per week and performing HIIT.[2] The goal of an optimal cardiovascular exercise program would be to determine the balance between aerobic endurance training and HIIT that would effectively increase aerobic capacity and minimize injury risk. This optimal level of endurance training and HIIT training still needs to be determined.

7.4 Injury Risk Factors

In this investigation, Soldiers who road marched 2-3 times per month with their unit had a lower risk of injury compared to Soldiers who did not perform any road marching per month. Further investigation indicated that 24% of those who did not road march were in the 1-10 CAV, who had the highest injury rates and another 50% of those who did not road march were in the support units who had the slowest 2-mile run times on their APFT. Poor performance on the APFT 2-mile run test has been associated with higher injury risk.[28 29 30 31 32] Therefore, Soldiers who road marched 2-3 times per week, were likely protected from other factors and may not be due to the fact that they performed road marching 2-3 times per week.

Injury risk for the slowest 2-mile run times was higher when compared to those running the fastest 2-mile run times. As mentioned above previous studies investigating run times during basic combat training have also found that slower run times place Soldiers at a higher risk of injury.[28 29 30 31 32] The Soldiers with the slowest 2-mile run times have lower aerobic capacities than those with the fastest 2-mile run times.[23 33] Soldiers with lower aerobic capacities will likely experience greater physiological stress and/or fatigue during tasks (such as running, cross-training and calisthenics) due to exercising at a higher percentage of their maximum aerobic capacity when compared to Soldiers with greater fitness levels. Soldiers of lower fitness levels will not only be exercising at a higher percentage of their aerobic capacity to accomplish the same task as a more fit Soldier, but they will also perceive tasks as more difficult.[34] The greater physiological stress and/or fatigue experienced may lead to a higher risk of injury. Studies on fatigue have demonstrated decrements in proprioceptive ability,[35] a decrease in joint stability,[36] alterations in muscle activity,[35] changes in gait,[37 38 39 40 41] balance,[42 43] low frequency fatigue,[44] neuromuscular function,[45] and ligament laxity as fatigue increases.[46]

Injury risk was higher in smokers than nonsmokers. Previous studies have also demonstrated an increased risk of injury in smokers compared to nonsmokers, the number of cigarettes smoked per day, and risk of musculoskeletal injury.[4 30 47 48 49 50 51 52 53 54] The relationship between tobacco use and injury may be due to a compromised ability to repair damaged tissues, thereby increasing susceptibility to the repetitive microtrauma that leads to injury.[55] In one investigation researchers showed that tibial fracture healing to clinical union took 24% longer in smokers compared to non-smokers, [56] while another study showed that smokers experienced impaired wound healing when compared to non-smokers.[57] Therefore, in smokers maintaining high levels of physical fitness to accomplish physically demanding tasks and military occupational specialty (MOS) requirements, this may result in weakened tissues from training and overuse, which may result in a greater susceptibility of injury.

The 1-10 CAV had the highest injury incidence (42%) after the implementation of IHPOP. The amount of training and their fitness scores from the APFT were similar to the other battalions (Appendix B Table 5.1). As a result, it cannot be determined without further information why their injury rates were higher when compared to the other battalions (Appendix B Table 5.1).

In the current study, 64% of the men were considered either overweight or obese, which is identical to the United States population where 64% of men between the ages of 20 to 39 are also considered either overweight or obese.[58] Injury risk for men was higher for those with a BMI classifying them as obese. Previous literature has shown that Soldiers with a higher BMI are at a greater risk of injury.[14 47 59] In a study investigating infantry Soldiers, Reynolds et al. found that Soldiers with a BMI ≥ 25 were at a 2.2 times greater risk of being injured.[14] In the current evaluation, only those who were obese had a greater risk of being injured.

According to the CDC, BMI is a fairly reliable indicator of body fatness for most people.[60] Therefore Soldiers with higher BMIs will most likely have larger amounts of excess body fat. Investigations examining excessive body fat have shown that it adversely affects performance on military tasks that require both aerobic and strength components.[61 62 63 64] In a study investigating physical and physiological performance in Army Soldiers, Crawford et al. found that Soldiers with ≤ 18% body fat performed significantly better on 7 of 10 fitness tests, compared to Soldiers with a body fat of > 18%. Soldiers with ≤ 18% body fat may have performed better because they had similar amounts of fat free mass when compared to Soldiers with > 18% body fat. The authors suggested that Soldiers who have an excess amount of body fat may possess physiological fitness and musculoskeletal deficits, thereby decreasing military readiness and increasing risk for injury.[61] In another investigation of active duty Navy personnel, Bohnker et al. examined mean BMI and overall physical readiness test scores (Outstanding, Excellent, Good, Satisfactory and Fail). As physical fitness test scores decreased, mean BMI increased for both men and women.[64]

Soldiers who ran an intermediate number of miles per week (5-9 miles) for personal PT were at lower risk of injury than those who ran a higher number of miles per week (≥ 20 miles). It has been shown that risk of injury increases with miles run per week.[65 66 67] Other risk factors associated with running-related injuries include gender, age, BMI, previous injury, smoking, running experience, frequency, and biomechanics.[68 69 70] Countermeasures to prevent running injuries include decreasing excess body fat, maintaining a weekly running mileage within certain limits, and improving aerobic endurance.

8 Conclusions and Recommendations

- Given that the IHPOP had similar injury rates and fitness performance before and after implementation, no recommendation can be made for or against implementation of IHPOP and a MAT.

- Limited duty days increased by 32% after the implementation of IHPOP. The additional days of limited duty could be attributed to the MAT which provided enhanced access to care and improved follow-up potentially resulting in more complete recovery. This may lead to fewer injuries in the future and less limited duty days. A more detailed longitudinal study is needed to determine MAT effects and if those who received care from the MAT subsequently experienced fewer or less severe injuries.

- The most common type of injuries were sprains/strains of the lower extremities attributed to physical activity. These results are similar to other investigations examining injuries in military populations.

- Physical fitness performance slightly improved after implementation of IHPOP for muscular endurance (push-ups) and total APFT score. Although significant, these changes are minimal and not very indicative of improved performance.

- The amount of long distance running and road marching decreased after the implementation of IHPOP and were replaced with cross-training, agility training and sprint training. With this new exercise program, there were minimal changes in fitness performance.

- The goal of an optimal cardiovascular exercise program would be to determine the balance between aerobic endurance training and cross-training that would effectively increase aerobic capacity and minimize injury risk.

- Soldiers who had poor performance on the 2-mile run were smokers, obese, or ran ≥ 20 miles per week for personal PT were at a higher risk of injury. These are all modifiable risk factors and can be reduced to decrease injury rates.

9 Point of Contact

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Appendix A

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APPENDIX B

1. Descriptive Statistics Comparing Matched Men and Women

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Table 6.6 Survey Results: Dietary Supplement Use and Injury Risk for Men After IHPO

Table 1.1 Survey and DMSS Results: Demographics Comparing Differences between Men and Women

Variable	Level of Variable	Men	Women	Men and Women	Difference Between Men and Women	Chi-Square p-value (men vs. women)
		n (%)	n (%)	n (%)	%	
Gender	Men Women			1183(95%) 67(5%)		
Age	≤ 22 23-25 26-30 31+	263(22%) 281(24%) 345(29%) 294(25%)	24(36%) 16(24%) 19(28%) 8(12%)	287(23%) 297(24%) 364(29%) 302(24%)	14% 0% 1% 13%	0.02
BMI	<25	420(36%)	39(58%)	49(37%)	22%	<0.01
	25-29.9	590(51%)	26(39%)	616(50%)	12%	
	≥30	152(13%)	2(3%)	154(13%)	10%	
Rank	E1-E3	310(26%)	25(37%)	335(27%)	11%	.04
	E4-E6	737(62%)	35(52%)	772(62%)	10%	
	E7-E9	54(5%)	----	54(4%)	5%	
	O1-O3	60(5%)	7(10%)	67(5%)	5%	
	O4-O6	8(1%)	-----	8(1%)	----	
	W1-W3	14(1%)	-----	14(1%)	1%	
Race	Caucasian	851(72%)	32(48%)	883(71%)	24%	<0.01
	Asian	52(4%)	5(8%)	57(5%)	4%	
	Black	117(10%)	17(25%)	134(11%)	15%	
	Hispanic	140(12%)	9(13%)	149(12%)	1%	
	American Indian	17(1%)	4(6%)	21(2%)	5%	
Education Level	No High School	16(1%)	----	16(1%)	1%	0.11
	High School	967(83%)	51(76%)	1018(83%)	7%	
	Some College	92(8%)	7(10%)	99(8%)	2%	
	Bachelors	79(7%)	8(12%)	87(7%)	5%	
	Masters	7(7%)	----	7(1%)	7%	
	Doctorate	2(0.2%)	1(2%)	3(0.2%)	1.8%	
Marital Status	Single	441(37%)	34(51%)	475(38%)	14%	<0.01
	Married	695(59%)	26(39%)	721(58%)	20%	
	Other (Separated/Divorced/ Widowed)	47(4%)	7(10%)	54(4%)	6%	
Battalion	3-16 FA	18(2%)	1(2%)	19(2%)	0%	<0.01
	1-10 CAV	162(14%)	5(8%)	167(13%)	6%	
	1-67 AR	218(18%)	6(9%)	224(18%)	9%	
	2-8 IN	449(38%)	6(9%)	455(36%)	29%	
	204 BSB	123(10%)	29(43%)	152(12%)	33%	
	2-4 STB	213(18%)	20(30%)	233(19%)	12%	

Table 1.2 Survey Results: Military Occupational Specialty and Physical Demand Levels for Enlisted Soldiers Comparing Differences between Men and Women

Variable	Level of Variable	Men	Women	Difference Between Men and Women	Men and Women
		n	n		n
Military Occupational Specialty	Infantry	354(32%)	----	32%	354(30%)
	Field & Air Defense Artillery	39(4%)	1(2%)	2%	40(3%)
	Signals & Communication	51(5%)	2(3%)	2%	53(5%)
	Armor	176(16%)	----	16%	176(15%)
	Engineers	38(3%)	----	3%	38(3%)
	Military Intelligence, Unmanned aircraft operator, Psyop, Electronic warfare	23(2%)	5(8%)	6%	28(2%)
	Support/Admin	9(1%)	5(8%)	7%	14(1%)
	Medical Corp	40(4%)	5(8%)	4%	45(4%)
	Supply & Logistics	111(10%)	23(38%)	28%	134(12%)
	Chemical warfare, explosives, and ammunition	10(1%)	5(8%)	7%	15(1%)
	Transportation	51(5%)	4(7%)	2%	55(5%)
	Military Police	239(2%)	----	2%	23(2%)
	General Equipment and missile repair	180(16%)	10(17%)	1%	190(16%)
MOS Physical Demand Level	Very Heavy	861(79%)	31(52%)	27%	892(77%)
	Moderately Heavy	106(10%)	12(20%)	10%	118(10%)
	Heavy	90(8%)	13(22%)	14%	103(9%)
	Medium	13(1%)	4(7%)	6%	17(2%)
	Light	2(0.2%)	----	0.2%	2(0.2%)
	NA	22(2%)	----	2%	22(2%)

Table 2.1 Survey Results: Unit Physical Training Before and After the Implementation of IHPO for Matched Men

Variable	Level of Variable	Before PRT	After PRT	Difference	p -value
Participate in Unit PT	No	54 (5%)	58 (5%)	0%	0.83*
	Yes	1121 (95%)	1125 (95%)	0%	
How Often Participate in Unit PT	< 5 times a wk	179 (16%)	232 (21%)	+5%	<0.01***
	5-7 times a wk	894 (80%)	837 (71%)	-9%	
	>7 times a wk	45 (4%)	37 (3%)	-1%	
Do You Participate in Alternate PT?	No	920(84%)	954(93%)	+9%	<0.01**
	Profile PT	104(9%)	57(6%)	-3%	
	Weight Control PT	33(3%)	13(1%)	-2%	
	Other	44(4%)	6(1%)	-3%	
Perform Cross-training type of exercises and types of Cross-training performed	No	371 (34%)	266 (24%)	-10%	<0.01*
	Yes[1]	737 (66%)	832 (76%)	+10%	
	Basic Cross-training	622 (56%)	225 (21%)	-35%	<0.01**
	TRX	13 (1%)	15 (1%)	0%	
	P90X	16 (1%)	22 (2%)	+1%	
	Crossfit[2]	----	80 (7%)	----	
	IHPO[2]	----	300 (27%)	----	
	Other	33 (3%)	8 (1%)	-2%	
	One or More Cross-training programs	53 (5%)	182 (17%)	+12%	
Number of times per week Cross-training performed	No Cross-training	371(34%)	266(25%)	-9%	<0.01***
	< 1 time per wk	109(10%)	81(8%)	-2%	
	1-2 times per wk	376(34%)	338(32%)	-2%	
	3-4 times per wk	163(15%)	239(23%)	+8%	
	> 4 times per wk	86(8%)	138(13%)	+5%	
Times per wk of Distance Running	No distance running	11(1%)	16(2%)	+1%	<0.01***
	< 1 time per wk	40(4%)	69(6%)	+2%	
	1-2 times per wk	489(44%)	536(49%)	+5%	
	3-4 times per wk	525(47%)	419(38%)	-9%	
	> 4 times per wk	52(5%)	59(5%)	0%	
Distance ran per wk	No distance running	11(1%)	16(2%)	+1%	<0.01***
	1 mile	11(1%)	20(2%)	+1%	
	2-3 miles	462(43%)	583(54%)	+11%	
	≥ 4 miles	603(56%)	454(42%)	-14%	

* McNemar Test (2x2 only)
**The Marginal Homogeneity Test (Nominal Data)
*** Wilcoxon Signed Rank Test (Ordinal Data)
[1]Composed of the different types of Cross-training programs listed below
[2] Not asked on initial survey

Table 2.1 Survey Results: Unit Physical Training Before and After the Implementation of IHPO for Matched Men (Continued)

Variable	Level of Variable	Before PRT	After PRT	Difference	(p -value)
Total Distance Ran per wk	< 5 miles per wk	261(24%)	397(38%)	+14%	<0.01***
	5-9 miles per wk	433(40%)	385(37%)	-3%	
	10-19 miles per wk	309(29%)	248(24%)	-5%	
	20 + miles per wk	73(7%)	25(2%)	-5%	
Times per wk of Sprint/Interval Training	No Sprints	52(5%)	31(3%)	-2%	<0.01***
	< 1 time per wk	236(21%)	170(15%)	-6%	
	1-2 times per wk	687(62%)	699(63%)	+1%	
	3-4 times per wk	123(11%)	182(17%)	+6%	
	> 4 times per wk	17(2%)	24(2%)	0%	
Times per wk of Calisthenics	No Calisthenics	50(5%)	33(3%)	-2%	0.03***
	< 1 time per wk	157(14%)	111(10%)	-4%	
	1-2 times per wk	371(31%)	414(38%)	+7%	
	3-4 times per wk	312(28%)	314(28%)	0%	
	> 4 times per wk	227(20%)	232(21%)	+1%	
Times per wk of Resistance Training	No Resistance	403(37%)	300(27%)	-10%	<0.01***
	< 1 time per wk	267(23%)	292(26%)	+3%	
	1-2 times per wk	349(32%)	378(34%)	+2%	
	3-4 times per wk	72(7%)	124(11%)	+4%	
	>4 times per wk	9(1%)	14(1%)	0%	
Times per wk of Agility Drills	No Agility Drills	423(38%)	241(22%)	-16%	<0.01***
	< 1 time per wk	292(27%)	264(24%)	-3%	
	1-2 times per wk	285(26%)	397(36%)	+10%	
	3-4 times per wk	85(8%)	168(15%)	+7%	
	>4 times per wk	17(2%)	35(3%)	+1%	
Times per month performing Road Marches	No Road Marching	62(6%)	70(6%)	0%	<0.01***
	< 1 time per month	294(27%)	422(38%)	+11%	
	2 times per month	268(24%)	329(30%)	+6%	
	3 times per month	134(12%)	136(12%)	0%	
	4 times per month	342(31%)	151(14%)	-17%	
Weight of Load carried while Road Marching	No Road Marching	62(6%)	70(7%)	+1%	0.18***
	0-15 lbs	22(2%)	29(3%)	+1%	
	16-30 lbs	197(18%)	177(16%)	-2%	
	31-50 lbs	669(61%)	686(64%)	+3%	
	> 50 lbs	142(13%)	114(11%)	-2%	
Distance Road Marched	No Road Marching	62(6%)	70(7%)	+1%	0.82***
	1-3 miles	159(15%)	149(14%)	-1%	
	4-6 miles	685(63%)	648(60%)	-3%	
	7-10 miles	156(14%)	186(17%)	+3%	
	> 10 miles	24(2%)	20(2%)	0%	

* McNemar Test (2x2 only)
**The Marginal Homogeneity Test (Nominal Data)
*** Wilcoxon Signed Rank Test (Ordinal Data)

Table 2.1 Survey Results: Unit Physical Training Before and After the Implementation of IHPO for Matched Men (Continued)

Variable	Level of Variable	Before PRT	After PRT	Difference	(p -value)
Times per wk running while wearing body armor	No Body Armor	707(64%)	570(53%)	-11%	<0.01***
	< 1 time per wk	300(27%)	358(33%)	+6%	
	1-2 times per wk	85(8%)	120(11%)	+3%	
	≥ 3 times per wk	21(2%)	34(3%)	+1%	
Distance run per wk while wearing body armor	No Body Armor	707(66%)	570(56%)	-10%	<0.01***
	0-1 mile	169(16%)	165(16%)	0%	
	2-3 miles	162(15%)	248(24%)	+9%	
	> 3 miles	31(3%)	43(4%)	+1%	
Times per wk exercising in the swimming pool	No swimming	951(84%)	886(81%)	-3%	0.15***
	< 1 time per month	101(9%)	118(11%)	+2%	
	1-2 times per month	64(6%)	63(6%)	0%	
	≥ 3 times per month	21(2%)	23(2%)	0%	
Times per month training for the APFT	No APFT training	227(20%)	214(19%)	-1%	<0.01***
	< 1 time per month	168(15%)	187(17%)	+2%	
	1-2 times per month	322(28%)	362(33%)	+5%	
	3-4 times per month	228(20%)	214(19%)	-1%	
	≥ 5 times per month	193(17%)	132(12%)	-5%	
Do you lead PT for your squad or platoon	No	757(64%)	676(61%)	-3%	<0.01*
	Yes	373(33%)	434(39%)	+6%	

* McNemar Test (2x2 only)
**The Marginal Homogeneity Test (Nominal Data)
*** Wilcoxon Signed Rank Test (Ordinal Data)

Table 2.2 Survey Results: Personal Physical Fitness Training Before and After the Implementation of IHPO for Men (Matched Data)

Variable	Level of Variable	Before PRT	After PRT	Difference	(p -value)
Perform Personal PT	No	208(18%)	196(17%)	-1%	
	Yes	972(82%)	986(83%)	+1%	
Times per wk of Distance Running	No Distance Running	337(29%)	336(29%)	0%	0.14***
	< 1 time per wk	233(20%)	207(18%)	-2%	
	1-2 times per wk	398(34%)	419(36%)	+2%	
	3-4 times per wk	154(13%)	165(14%)	+1%	
	≥ 5 times per wk	38(3%)	43(4%)	+1%	
Distance ran per wk	No Distance Running	337(29%)	336(29%)	0%	0.60***
	1 mile	95(8%)	87(8%)	0%	
	2-3 miles	500(44%)	522(46%)	+2%	
	4-5 miles	164(14%)	173(15%)	+1%	
	≥ 6 miles	47(4%)	28(2%)	-2%	
Total Distance ran per wk for Personal PT	No Distance Running	337(29%)	336(30%)	+1%	0.99***
	< 5 miles	528(46%)	503(44%)	-2%	
	5-9 miles	173(15%)	198(18%)	+3%	
	10-19 miles	69(6%)	66(6%)	0%	
	≥ 20 miles	36(3%)	31(3%)	0%	
Total Distance ran per wk for Unit and Personal PT	1-9 miles	438(39%)	555(50%)	+11%	<0.01***
	10-19 miles	497(44%)	401(36%)	-8%	
	20-29 miles	112(10%)	129(11%)	+1%	
	30 + miles	83(7%)	24(2%)	-5%	
Times per wk of Resistance Training	No Weight Training	364(31%)	338(29%)	-3%	0.35***
	< 1 time per wk	135(12%)	148(13%)	+1%	
	1-2 times per wk	314(27%)	322(28%)	+1%	
	3-4 times per wk	240(21%)	261(22%)	+1%	
	≥ 5 times per wk	111(10%)	102(9%)	-1%	
Times per week of Sprint Training	No Sprints	561(48%)	508(43%)	-5%	0.03***
	< 1 time per wk	226(19%)	261(22%)	+3%	
	1-2 times per wk	304(26%)	302(26%)	0%	
	≥ 3 times per wk	82(7%)	99(9%)	+2%	
Personal PT based on	No personal training	206(18%)	197(22%)	+4%	<0.01**
	Traditional PT	284(24%)	183(21%)	-3%	
	Cross-training/ECP	452(39%)	410(47%)	+8%	
	Other	229(20%)	92(10%)	-10%	

* McNemar Test (2x2 only)
**The Marginal Homogeneity Test (Nominal Data)
*** Wilcoxon Signed Rank Test (Ordinal Data)

Table 2.3 Survey Results: Self-Reported Rating of Ability Compared to Others of the Same Age and Gender for Matched Men

Variable	Far Less than Average		Less than Average		Average		Greater than Average		Far Greater than Average	
	Before	After	Before	After	Before	After	Before	After	Before	After
Endurance	14(1%)	27(2%)	109(9%)	87(7%)	570(49%)	589(50%)	395(34%)	381(33%)	84(7%)	90(8%)
Difference	+2%		-2%		+1%		-1%		+1%	
Sprint Speed	29(3%)	21(2%)	128(11%)	110(9%)	562(48%)	560(48%)	371(32%)	384(33%)	83(7%)	101(9%)
Difference	-1%		-2%		0%		+1%		+2%	
Strength	8(1%)	12(1%)	69(6%)	55(5%)	631(54%)	617(53%)	389(33%)	389(33%)	70(6%)	100(9%)
Difference	0%		-1%		-1%		0%		+3%	
Flexibility	43(4%)	44(4%)	258(22%)	195(17 %)	550(47%)	606(52%)	250(21%)	252(21%)	69(6%)	78(7%)
	0%		-5%		+5%		0%		+1%	
Body Fat	101(9 %)	117(10 %)	248(21%)	229(19 %)	595(51%)	625(53%)	165(14%)	150(13%)	63(5%)	52(4%)
Difference	+1%		-2%		+2%		-1%		-1%	

Table 2.4 Survey Results: Army Physical Fitness Test and BMI for Matched Men

Variable	Variable Level	Before PRT	After PRT	Difference	p-value
2-Mile Run (minutes and fraction of a minutes)	≤ 13.75 min	300(28%)	253(25%)	-3%	<0.01***
	13.76-14.67 min	272(26%)	261(25%)	-1%	
	14.68-15.75 min	253(24%)	250(24%)	0%	
	15.76+ min	237(22%)	265(26%)	+4%	
Push-Ups	≤55 reps	267(24%)	257(24%)	0%	0.03***
	56-66 reps	287(26%)	252(23%)	-3%	
	67-76 reps	288(26%)	299(28%)	+2%	
	77+ reps	269(24%)	275(25%)	+1%	
Sit-Ups	≤ 60 reps	326(29%)	310(29%)	0%	0.15***
	61-68 reps	267(24%)	245(23%)	-1%	
	69-76 reps	244(22%)	244(23%)	+1%	
	77+ reps	275(25%)	280(26%)	+1%	
Total APFT Score	≤ 235	304(29%)	268(26%)	-3%	0.63***
	236-260	262(25%)	270(26%)	+1%	
	261-280	229(22%)	234(23%)	+1%	
	281+	260(25%)	249(25%)	0%	
BMI	≤ 25	457(39%)	420(36%)	-3%	<0.01***
	26-29	566(49%)	590(51%)	+2%	
	≥ 30	143(12%)	152(13%)	+1%	

* McNemar Test (2x2 only)
**The Marginal Homogeneity Test (Nominal Data)
*** Wilcoxon Signed Rank Test (Ordinal Data)

Table 2.5 Survey Results: Average Physical Fitness Test and BMI Scores for Matched Men

Variable	n	Before PRT (Mean ± SD)	After PRT (Mean ± SD)	Difference	Paired T-Test (p-value)
2-Mile Run (minutes and fraction of a minutes)	989	14.7±1.61	14.9±1.61	+ 0.2 or (+12 seconds)	<0.01
Push-Ups (reps)	1044	67±14.18	68±14.22	+1	<0.01
Sit-Ups (reps)	1042	68±12.81	69±12.62	+1	0.38
Total APFT Score (points)	968	251±46.17	255±32.36	+4	<0.01
BMI	1146	26.0 ±3.47	26.1±3.39	+0.1	<0.01

Table 2.6 Average Initial Physical Fitness Test Performance before the Implementation of IHPO

Variable	n	Before PRT (Mean ± SD)	After PRT (Mean ± SD)
Pull Ups	2120	5.8 ± 4.5	No Tests Performed
Broad Jump	1995	77.8 ± 10.2	No Tests Performed
FMS Total Score	2116	15.6 ± 3.5	No Tests Performed

Table 2.7 Survey Results: Tobacco Use for Matched Men

Variable	Level of Variable	Before PRT	After PRT	Difference	p -value
Smoker or Non-Smoker	Non-Smoker	599(51%)	633(54%)	+3%	0.02*
	Smoker	569(49%)	544(46%)	-3%	
Smoked 100 Cigarettes in Life	No	456(39%)	428(36%)	-3%	<0.01*
	Yes	712(61%)	754(64%)	+3%	
Age when first smoked whole cigarette	≤ 14 years	279(32%)	260(33%)	-1%	0.05***
	15-16 years	200(23%)	193(24%)	+1%	
	17-18 years	266(26%)	201(25%)	-1%	
	19+ years	182(21%)	141(18%)	-3%	
Days smoked in the past 30 days	≤ 15 days	146(25%)	111(21%)	-4%	0.11*
	> 15 days	448(75%)	426(79%)	+4%	
How many cigarettes smoked in the last 30 days	None	566(49%)	622(53%)	+4%	0.75***
	1-10 cigs	399(34%)	305(26%)	-8%	
	11-20 cigs	181(16%)	185(16%)	0%	
	21+ cigs	18(2%)	40(3%)	+1%	
How many years have you smoked if you are currently smoking	Non-Smoker	599(54%)	633(57%)	+3%	0.84***
	0-5 years	179(16%)	145(13%)	-3%	
	6-10 years	166(15%)	166(15%)	0%	
	11 + years	166(15%)	168(15%)	0%	
Years quit smoking	< 5 years	59(50%)	62(59%	+9%	-----[1]
	≥ 5 years	60(50%)	44(42%)	-8%	
Smokeless tobacco	No	860(73%)	924(79%)	+6%	<0.01
	Yes	323(27%)	241(21%)	-6%	
Days used smokeless tobacco in the past 30 days	≤ 15 days	134(43%)	83(37%)	-6%	-----[1]
	> 15 days	175(57%)	142(63%)	+6%	
How many cans, pouches or plugs used per day	≤ 1	231(79%)	111(53%)	26%	<0.01
	2-3	27(9%)	38(18%)	+9%	
	>3	35(12%)	59(28%	+16%	
How many years have you used smokeless tobacco if your are currently using smokeless tobacco	≤1 years	44(17%)	23(12%)	-5%	0.06
	2-5 years	101(40%)	79(40%)	0%	
	>5 years	110(43%)	96(49%)	+6%	

* McNemar Test (2x2 only)
**The Marginal Homogeneity Test (Nominal Data)
*** Wilcoxon Signed Rank Test (Ordinal Data)
[1] Small sample size with low matching data before and after

Table 2.8 Survey Results: Nutrition and Dietary Habits for Matched Men

Variable	Level of Variable	Before PRT	After PRT	Difference	p -value
How healthy is your overall diet	Excellent	45(4%)	79(7%)	+3%	<0.01***
	Very Good	204(17%)	270(23%)	+5%	
	Good	607(52%)	586(50%)	-2%	
	Fair	279(24%)	211(18%)	-6%	
	Poor	42(4%)	35(3%)	-1%	
Times per week eat breakfast	Never	71(6%)	68(6%)	0%	<0.01***
	1-2 times per wk	286(24%)	353(30%)	+6%	
	3-4 times per wk	368(31%)	367(31%)	0%	
	5-7 times per wk	453(38%)	393(33%)	-5%	0.96**
Largest meal of the day	Breakfast	207(18%)	203(17%)	-1%	
	Lunch	192(16%)	209(18%)	+2%	
	Dinner	659(56%)	637(54%)	-2%	
	All the same	119(10%)	131(11%)	+1%	<0.01***
Meals per wk eaten at the DFAC	None	624(53%)	748(63%)	+10%	
	1-3 meals	252(21%)	233(20%)	-1%	
	4-6 meals	146(12%)	117(10%)	-2%	
	7-10 meals	77(7%)	46(4%)	-3%	
	>10 meals	79(7%)	37(3%)	-4%	
Do you use the nutrition cards/labels at the DFAC	Always	82(7%)	64(15%)	+8%	<0.01***
	Sometimes	256(23%)	182(42%)	+19%	
	Never	650(57%)	166(38%)	-19%	
	What labels?	145(13%)	21(5%)	-8%	
Meals per week from fast food places	None	236(20%)	209(17%)	-3%	
	1-3 meals	784(67%)	764(65%)	-2%	<0.01***
	4-6 meals	133(11%)	163(14%)	+3%	
	7-10 meals	19(2%)	36(3%)	+1%	
	>10 meals	6(1%)	9(1%)	0%	
Water intake per day in ounces	None	20(2%)	36(3%)	+1%	<0.01***
	16 ounces	156(13%)	166(14%)	+1%	
	32 ounces	363(31%)	407(35%)	+4%	
	64 ounces	416(36%)	394(34%)	-2%	
	128 ounces	113(10%)	92(8%)	-2%	
	> 1 gallon	98(8%)	71(6%)	-2%	
Energy drinks per day	None	641(54%)	596(50%)	+4%	<0.01***
	1-2 cans	428(36%)	440(38%)	+2%	
	3-4 cans	83(7%)	90(8%)	+1%	
	5-6 cans	15(1%)	27(2%)	+1%	
	>6 cans	11(1%)	16(1%)	0%	
Sports drinks per day	None	507(43%)	507(43%)	0%	0.65
	1-2 cans	525(45%)	489(42%)	-3%	
	3-4 cans	109(9%)	146(13%)	+4%	
	5-6 cans	27(2%)	21(2%)	0%	
	>6 cans	11(1%)	7(1%)	0%	
How many cups of dark green vegetables do you eat per day	None	386(33%)	343(29%)	-4%	<0.01***
	1 cup raw or ½ cooked	468(40%)	436(37%)	-3%	
	2 cups raw or 1 cooked	229(20%)	272(23%)	+3%	
	3 cups raw or 1 ½ cooked	66(6%)	83(7%)	+1%	
	≥4 cups raw or 2 cooked	28(2%)	36(3%)	+1%	

Table 2.8 Survey Results: Nutrition and Dietary Habits for Matched Men (continued)

Eat a protein meal 30 minutes after working out	Always	334(28%)	400(34%)	+6%	<0.01***
	Sometimes	536(46%)	517(44%)	-2%	
	Never	309(26%)	249(21%)	-5%	

* McNemar Test (2x2 only)
**The Marginal Homogeneity Test (Nominal Data)
*** Wilcoxon Signed Rank Test (Ordinal Data)

Table 2.9 Survey Results: Dietary Supplement Use for Matched Men

Variable	Before PRT	After PRT	Difference	p -value
None	696(61%)	701(61%)	0%	0.82**
Weight Loss Supplements	17(2%)	15(1%)	-1%	
Performance Enhancement Supplements	83(7%)	65(6%)	-1%	
Nutritional Supplements	180(16%)	213(19%)	+3%	
Weight Loss and Performance Enhancement Supplements	12(1%)	5(0.4%)	-0.6%	
Weight Loss and Nutritional Supplements	10(1%)	9(1%)	0%	
Performance Enhancement and Nutrition Supplements	134(12%)	129(11%)	-1%	
Weight Loss, Performance Enhancement and Nutritional Supplements	16(1%)	17(1%)	+1%	

* McNemar Test (2x2 only)
**The Marginal Homogeneity Test (Nominal Data)
*** Wilcoxon Signed Rank Test (Ordinal Data)

Table 3.1 Survey Results: Self-Reported Type of Injuries for Men after the Implementation of IHPO

Type of Injury	n (%)
Sprain/Strain	233(47%)
Pain	76(15%)
Broken/Fractured bone	44(9%)
Tendonitis or Bursitis	19(4%)
Bruise/Contusion	14(3%)
Cut/Laceration	17(3%)
Dislocation	14(3%)
Nerve Injury	10(2%)
Concussion	8(2%)
Scrap/Abrasion	7(1%)
Blister	7(1%)
Burn	1(0.2%)
Other	46(9%)
Total	496(100%)

Table 3.2 Survey Results: Self-Reported Area of Injury for Men after the Implementation of IHPO

Type of Injury	n (%)
Knee	104(21%)
Ankle	65(13%)
Lower Back	58(12%)
Foot	50(10%)
Shoulder	46(9%)
Lower leg (Calf/Shin)	23(5%)
Hand/Fingers	22(4%)
Head/Face	15(3%)
Pelvic Area	14(3%)
Arm	13(3%)
Upper Back	12(2%)
Abdominal Area	11(2%)
Wrist	10(2%)
Hip	10(2%)
Upper Leg (Thigh)	9(2%)
Upper and Lower Body	9(2%)
Neck	6(1%)
Elbow	5(1%)
Lower Body	5(1%)
Chest	4(1%)
Upper Body	4(1%)
Other	1(0.2%)
Total	496(100%)

Table 3.3 Survey Results: Self-Reported Activity Being Performed when Injury Occurred for Men after the Implementation of IHPO

Variable	Level of Variable	n (%)
What were you doing when your most recent injury occurred?	Performing military duties or training, but not deployed	374(76%)
	Doing leisure activities (off duty)	100(20%)
	Performing military duties or training while deployed	18(4%)
Was your most recent injury accidental or intentional by someone else	Accidental/Unintentional	468(98%)
	Intentional by someone else	11(2%)
If accidental/unintentional what activity were you doing	Running	155(34%)
	Walking, hiking or road marching	73(16%)
	Lifting or moving heavy objects	60(13%)
	Other Exercise	33(7%)
	Sports	32(7%)
	Repairing equipment or vehicles	21(5%)
	Stepping or climbing	18(4%)
	Riding or driving in a motorized vehicle	15(3%)
	Other	52(11%)
If accidental/unintentional how did the injury occur?	Overexertion, strenuous, of repetitive movements	201(43%)
	Fall, jump, trip or slip	168(36%)
	Struck against or struck by an object or person	51(11%)
	Cut by a sharp instrument, tool, or object	12(3%)
	Fire, hot substance or object, or steam	1(0.2%)
	Environmental factors such as heat or cold	1(0.2%)
	Breathing or swallowing dust, particle, fumes	0(0%)
	Other	30(7%)
Did you receive medical care?	No	106(22%)
	Yes	379(78%)
Who provided the medical care? (Soldiers may have received medical care from multiple providers?	Doctor/Physician	239(34%)
	Medic	141(20%)
	Physical Therapist	128(18%)
	Physician Assistant	110(16%)
	Nurse	39(6%)
	Athletic Trainer	23(3%)
	Other	13(2%)
Were you hospitalized?	No	442(93%)
	Yes	36(7%)
Were you placed on a profile or limited duty?	No	69(19%)
	Yes	301(81%)
If yes, how many days?	≤ 30 days	205(71%)
	> 30 days	82(29%)

Table 4.1 Survey Results: APFT Self-Reported Scores and Injury Risk for Men after the Implementation of IHPO

Variable	Variable Level	N	%Injury (After PRT)	Risk Ratio (95% CI)	p-value
2-Mile Run (minutes and Fraction of a minute)	≤ 13.75 min	503	30%	1.00	
	13.76-14.67 min	526	31%	1.02 (0.85-1.22)	0.84
	14.68-15.75 min	554	33%	1.10 (0.92-1.31	0.31
	15.76+ min	517	39%	1.29 (1.08-1.52)	<0.01
Push-Ups	≤ 55reps	531	38%	1.17 (0.99-1.38)	0.06
	56-66 reps	538	36%	1.10 (0.93-1.30)	0.29
	67-76 reps	590	31%	0.94 (0.79-1.12)	0.50
	77+ reps	528	33%	1.00	
Sit-Ups	≤ 60 reps	636	38%	1.07 (0.92-1.24)	0.38
	61-68 reps	514	34%	0.97 (0.82-1.14)	0.71
	69-76 reps	477	28%	0.80 (0.66-0.95)	0.01
	77+ reps	561	35%	1.00	

Table 4.2 Survey Results: Self-Reported Ratings of Ability and Injury Risk of Soldiers compared to others of the Same Age and Gender for Men after the Implementation of IHPO

Variable	Variable Level	N	%Injury (After PRT)	Risk Ratio (95% CI)	p-value
Endurance	Far greater than avg	181	33%	1.00	
	Greater than avg	785	30%	0.91 (0.72-1.16)	0.46
	Average	1163	35%	1.08 (0.86-1.35)	0.51
	Less than avg	202	47%	1.44 (1.12-1.86)	<0.01
	Far less than avg	45	44%	1.36 (0.93-2.01)	0.14
Sprint Speed	Far greater than avg	210	30%	1.00	
	Greater than avg	789	33%	1.11 (0.88-1.39)	0.38
	Average	1121	35%	1.16 (0.93-1.45)	0.18
	Less than avg	212	38%	1.27 (0.97-1.67)	0.08
	Far less than avg	44	48%	1.59 (1.10-2.31)	0.02
Strength	Far greater than avg	186	35%	1.00	
	Greater than avg	798	33%	0.95 (0.76-1.18)	0.65
	Average	1258	35%	1.01 (0.82-1.24)	0.96
	Less than avg	110	34%	0.96 (0.69-1.34)	0.82
	Far less than avg	23	35%	1.00 (0.55-1.80)	0.99
Flexibility	Far greater than avg	150	35%	1.00	
	Greater than avg	526	30%	0.88 (0.68-1.13)	0.32
	Average	1203	36%	1.03 (0.81-1.30)	0.83
	Less than avg	408	34%	0.99 (0.77-1.28)	0.94
	Far less than avg	88	41%	1.18 (0.85-1.65)	0.34
Body Fat	Far greater than avg	105	38%	1.12 (0.83-1.51)	0.46
	Greater than avg	340	38%	1.12 (0.90-1.39)	0.32
	Average	1186	33%	0.98 (0.81-1.19)	0.85
	Less than avg	485	34%	1.00 (0.81-1.23)	0.96
	Far less than avg	256	34%	1.00	

Table 5.1 Summary of Injury Incidence, Physical Characteristics, APFT scores by Battalion for Men after the Implementation of IHPO

Variable	Variable Level	3-16 FA	1-10 CAV	1-67 AR	2-8 IN	204 BSB	2-4 STB
Injury Incidence After the Implementation of PRT		29%	42%	32%	35%	34%	33%
Age (years)		26.8	26.5	26.4	26.0	29.1	27.9
BMI (average)		26.1	25.7	26.0	25.9	26.6	26.2
Miles Run per week during Unit PT		8.3	8.3	8.3	7.4	7.2	7.6
Miles Run per week during Personal PT		5.9	5.3	5.3	5.4	6.1	6.5
Total Miles Run per week		12.5	11.8	11.9	11.4	10.9	12.5
Sit-Ups (reps)		67.7	68.4	67.1	70.0	66.9	67.4
Push-Ups (reps)		66.3	67.7	65.4	68.7	64.8	64.4
2-Mile Run Time in Minutes and Fraction of a Minute		14.9	14.8	14.9	14.6	15.2	15.3
Sprint or Interval Training	≥ 1 times per week	89%	76%	81%	85%	78%	86%
Calisthenics	≥ 1 times per week	90%	85%	85%	88%	85%	90%
Resistance Training	≥ 1 times per week	35%	41%	40%	52%	40%	43%
Agility Drills	≥ 1 times per week	56%	45%	44%	59%	40%	59%
Swimming	≥ 1 time per month	14%	8%	9%	8%	5%	6%
Tobacco Use	Smokers	44%	42%	44%	51%	38%	37%

Table 6.1 Survey Results: Demographic Injury Risk Factors for Men after the Implementation of IHPO (Women are only included in the Gender category)

Variable	Subcategory of Variable	N	% Injured	Risk Ratio (95%CI)	p-value
Gender	Men	2400	34%	1.00	
	Women	135	47%	1.38 (1.15-1.66)	<0.01
Age	18-22 years	663	32%	1.00	
	23-25 years	550	34%	1.06 (0.91-1.25)	0.45
	26-30 years	624	35%	1.09 (0.93-1.27)	0.29
	31+ years	563	37%	1.14 (0.98-1.33)	0.10
BMI	<25	861	32%	1.00	
	25-29.9	1177	34%	1.05 (0.93-1.19)	0.43
	≥30	298	43%	1.33 (1.13-1.56)	<0.01
Rank	E1-E3	800	33%	1.19 (0.86-1.65)	0.28
	E4-E6	1315	37%	1.35 (0.98-1.85)	0.05
	E7-E9	106	27%	1.00	
	O1-O3	139	27%	1.00 (0.66-1.51)	0.99
	O4-O6	21	29%	1.04 (0.50-2.20)	0.91
	W1-W3	19	37%	1.35 (0.69-2.62)	0.40
Race	Caucasian	1682	35%	1.00	
	Asian	103	23%	0.67 (0.47-0.96)	0.02
	Black	269	37%	1.08 (0.91-1.27)	0.40
	Hispanic	304	34%	0.98 (0.83-1.16)	0.82
	American Indian	31	42%	1.21 (0.80-1.85)	0.39
Education Level	No High School	31	45%	1.70 (1.07-2.69)	0.04
	High School	1958	35%	1.30 (1.01-1.68)	0.03
	Some College	172	39%	1.47 (1.07-2.00)	0.01
	Bachelors	173	27%	1.00	
	Masters	25	32%	1.20 (0.65-2.24)	0.57
	Doctorate	7	43%	1.61 (0.66-3.93)	0.38*
Marital Status	Single	968	31%	1.00	
	Married	1338	37%	1.20 (1.07-1.35)	<0.01
	Other (Separated/Divorced/Widowed)	94	35%	1.14 (0.85-1.53)	0.39
Battalion	3-16 FA	279	29%	1.00	
	1-10 CAV	372	42%	1.45 (1.17-1.81)	<0.01
	1-67 AR	443	32%	1.09 (0.87-1.37)	0.47
	2-8 IN	666	35%	1.19 (0.96-1.47)	0.10
	204 BSB	234	34%	1.18 (0.91-1.52)	0.21
	2-4 STB	396	33%	1.14 (0.90-1.44)	0.27

Table 6.2 Survey Results: MOS and Physical Demand Level Injury Risk Factors for Men after the Implementation of IHPO

Variable	Subcategory of Variable	N	% Injured	Risk Ratio (95%CI)	p-value (*Mid – P-exact)
Military Occupational Specialty	Infantry	600	32%	1.62 (0.78-3.34)	0.16
	Field & Air Defense Artillery	225	27%	1.33 (0.63-2.82)	0.43
	Signals & Communication	90	33%	1.67 (0.77-3.61)	0.18
	Armor	334	38%	1.90 (0.92-3.94)	0.05
	Engineers	78	36%	1.80 (0.83-3.90)	0.11
	Military Intelligence, Unmanned aircraft operator, Psyop, Electronic warfare	56	30%	1.52 (0.67-3.44)	0.30
	Support/Admin	27	44%	2.22 (0.97-5.1)	0.05
	Medical Corp	116	35%	1.72 (0.81-3.68)	0.13
	Supply & Logistics	221	40%	1.99 (0.96-4.15)	0.04
	Chemical warfare, explosives, and ammunition	23	39%	1.96 (0.81-4.71)	0.13
	Transportation	93	27%	1.34 (0.61-2.96)	0.45
	Military Police	30	20%	1.00	
	General Equipment and missile repair	335	42%	2.09 (1.01-4.32)	0.02
MOS Physical Demand Level	Very Heavy	1612	36%	1.23 (1.00-1.51)	0.04
	Moderately Heavy	254	29%	1.00	
	Heavy	164	46%	1.57 (1.22-2.02)	<0.01
	Medium	38	29%	0.99 (0.58-1.69)	0.98
	Light	4	50%	1.72 (0.63-4.66)	0.42*
	NA	39	23%	0.79 (0.43-1.45)	0.43

Table 6.3 Injury Risk Predicted from Physical Fitness Performance and APFT (Using initial fitness performance and injury data after the implementation of IHPO)

Variable	Variable Level	N	% Injured	Risk Ratio (95%CI)	p -value
Functional Movement Screening Total Score	≤ 14	573	58%	2.02 (1.70-2.41)	<0.01
	15-16	527	32%	1.12 (0.92-1.37)	0.26
	17-18	638	28%	0.97 (0.79-1.19)	0.78
	19-21	378	29%	1.00	
Pull-Ups (repetitions)	≤ 2	540	48%	1.52 (1.30-1.76)	<0.01
	3-5	636	37%	1.18 (1.00-1.38)	0.04
	6-8	395	31%	0.97 (0.80-1.18)	0.77
	9 +	549	32%	1.00	
Broad Jump (inches)	≤ 70	435	38%	1.08 (0.91-1.29)	0.38
	70.01 – 76.75	490	34%	0.98 (0.82-1.17)	0.85
	76.76 – 84.00	621	34%	0.96 (0.81-1.14)	0.63
	84.01	450	35%	1.00	
2-Mile Run (minutes and fraction of a minute)	15.76+	496	46%	1.56 (1.33-1.84)	<0.01
	14.68-15.75	496	37%	1.26 (1.06-1.50)	<0.01
	13.76-14.67	489	33%	1.11 (0.92-1.33)	0.29
	≤ 13.75	520	29%	1.00	
Push-Ups	≤ 55	540	40%	1.12 (0.96-1.31)	0.14
	56-66	541	38%	1.05 (0.89-1.23)	0.56
	67-76	539	35%	0.97 (0.83-1.15)	0.76
	77+	503	36%	1.00	
Sit-Ups	≤ 60	634	40%	1.16 (1.00-1.35)	0.06
	61-68	495	36%	1.03 (0.87-1.22)	0.70
	69-76	470	38%	1.11 (0.94-1.31)	0.20
	77+	520	34%	1.00	

Table 6.4 Survey Results: Injury Risk Factors for Tobacco Use After the Implementation of IHPO for Men

Variable	Level of Variable	N	% Injured	Risk Ratio (95%CI)	p -value
Smoker or Non-Smoker	Non-Smoker	1337	32%	1.00	
	Smoker	1043	37%	1.17 (1.05-1.31)	<0.01
Smoked 100 Cigarettes in Life	No	1074	31%	1.00	
	Yes	1317	37%	1.21 (1.08-1.35)	<0.01
Age when first smoked whole cigarette	≤ 14 years	487	39%	1.14 (0.94-1.38)	0.19
	15-16 years	380	36%	1.06 (0.86-1.31)	0.56
	17-18 years	416	33%	0.98 (0.79-1.21)	0.84
	19+ years	293	34%	1.00	
Days smoked in the past 30 days	≤ 15 days	254	33%	1.00	
	> 15 days	795	40%	1.22 (1.00-1.48)	0.04
How many cigarettes smoked in the last 30 days	None	1289	32%	1.00	
	1-10 cigs	658	37%	1.16 (1.02-1.31)	0.03
	11-20 cigs	309	41%	1.28 (1.10-1.50)	<0.01
	21+ cigs	69	38%	1.19 (0.87-1.63)	0.29
How many years have you smoked if you are currently smoking	Non-Smoker	1337	32%	1.00	
	0-5 years	328	36%	1.13 (0.96-1.33)	0.16
	6-10 years	303	39%	1.23 (1.05-1.44)	0.01
	11 + years	280	39%	1.23 (1.04-1.45)	0.02
Years quit smoking	< 5 years	126	36%	1.00	
	≥ 5 years	96	31%	1.14 (0.78-1.67)	0.49
Smokeless tobacco	No	1833	34%	1.00	
	Yes	523	35%	1.04 (0.91-1.19)	0.57
Days used smokeless tobacco in the past 30 days	≤ 15 days	191	35%	1.00	
	> 15 days	299	36%	1.05 (0.82-1.34	0.72
How many cans, pouches or plugs used per day	≤ 1	218	36%	1.00	
	2-3	91	39%	1.08 (0.78-1.47)	0.66
	>3	128	32%	0.90 (0.66-1.22)	0.48
How many years have you used smokeless tobacco if your are currently using smokeless tobacco	≤1 years	70	33%	1.00	
	2-5 years	184	36%	1.11 (0.75-1.63)	0.60
	>5 years	186	34%	1.05 (0.71-1.55)	0.82

Table 6.5 Survey Results: Dietary Habits for Men After IHPO

Variable	Level of Variable	N	% Injured	Risk Ratio (95%CI)	p -value
How healthy is your overall diet	Excellent	156	35%	1.00	
	Very Good	573	34%	0.97 (0.76-1.24)	0.83
	Good	1173	34%	0.98 (0.77-1.23)	0.83
	Fair	438	37%	1.06 (0.83-1.36)	0.63
	Poor	54	33%	0.96 (0.62-1.49)	0.86
Times per week eat breakfast	Never	136	35%	1.05 (0.82-1.35)	0.70
	1-2 times per wk	675	35%	1.05 (0.91-1.21)	0.51
	3-4 times per wk	797	36%	1.08 (0.95-1.24)	0.25
	5-7 times per wk	785	33%	1.00	
Largest meal of the day	Breakfast	384	36%	0.97 (0.79-1.19)	0.76
	Lunch	441	34%	0.93 (0.76-1.14)	0.48
	Dinner	1291	34%	0.91 (0.76-1.08)	0.28
	All the same	274	37%	1.00	
Meals per wk eaten at the DFAC	None	1454	36%	1.00	
	1-3 meals	477	32%	0.89 (0.76-1.02	0.08
	4-6 meals	259	33%	0.92 (0.77-1.11)	0.38
	7-10 meals	116	27%	0.74 (0.54-1.01)	0.04
	>10 meals	89	34%	0.94 (0.69-1.26)	0.66
Do you use the nutrition cards/labels at the DFAC	Always	122	27%	0.67 (0.44-1.02)	0.07
	Sometimes	366	32%	0.80 (0.57-1.12)	0.21
	Never	390	31%	0.78 (0.55-1.09)	0.16
	What labels?	62	40%	1.00	
Meals per week from fast food places	None	396	35%	1.00	
	1-3 meals	1596	33%	0.94 (0.81-1.10)	0.45
	4-6 meals	320	41%	1.16 (0.96-1.40)	0.13
	7-10 meals	67	30%	0.85 (0.58-1.26)	0.40
	>10 meals	15	33%	0.95 (0.46-1.97)	0.89
Water intake per day in ounces	None	59	39%	1.15 (0.82-1.60)	0.44
	16 ounces	325	33%	0.97 (0.81-1.13	0.62
	32 ounces	816	33%	0.97 (0.84-1.11)	0.72
	64 ounces	835	34%	1.00	
	128 ounces	195	42%	1.24 (1.02-1.50)	0.03
	> 1 gallon	135	37%	1.09 (0.86-1.38)	0.49
Energy drinks per day	None	1285	35%	1.00	
	1-2 cans	850	34%	0.97 (0.86-1.09)	0.59
	3-4 cans	168	36%	1.04 (0.84-1.29)	0.70
	5-6 cans	42	24%	0.68 (0.40-1.18)	0.14
	>6 cans	25	48%	1.38 (0.91-2.09)	0.17
Sports drinks per day	None	984	34%	1.00	
	1-2 cans	1019	34%	0.99 (0.88-1.12)	0.89
	3-4 cans	301	39%	1.14 (0.96-1.34)	0.14
	5-6 cans	50	22%	0.64 (0.38-1.09)	0.07
	>6 cans	16	31%	0.91 (0.44-1.90)	0.80
How many cups of dark green vegetables do you eat per day	None	713	34%	1.00	
	1 cup raw or ½ cooked	905	34%	1.00 (0.87-1.15)	0.99
	2 cups raw or 1 cooked	543	36%	1.07 (0.92-1.24)	0.40
	3 cups raw or 1 ½ cooked	150	35%	1.05 (0.83-1.33)	0.69
	≥4 cups raw or 2 cooked	56	39%	1.17 (0.83-1.64)	0.39
Eat a protein meal 30 minutes after working out	Always	789	32%	1.00	
	Sometimes	1075	35%	1.08 (0.94-1.22)	0.27
	Never	498	37%	1.14 (0.98-1.33)	0.10

Table 6.6 Survey Results: Dietary Supplement Use and Injury Risk for Men After IHPO

Variable	N	% Injured	Risk Ratio (95%CI)	p -value
None	1394	34%	1.00	
Weight Loss Supplements	30	57%	1.67 (1.21-2.31)	<0.01
Performance Enhancement Supplements	142	39%	1.14 (0.92-1.43)	0.24
Nutritional Supplements	432	34%	1.00 (0.86-1.16)	0.98
Weight Loss and Performance Enhancement Supplements	13	23%	0.68 (0.25-1.84)	0.41
Weight Loss and Nutritional Supplements	14	43%	1.27 (0.69-2.33)	0.48
Performance Enhancement and Nutrition Supplements	269	31%	0.92 (0.76-1.12)	0.40
Weight Loss, Performance Enhancement and Nutritional Supplements	28	36%	1.06 (0.64-1.74)	0.84

Appendix C

Initial Survey

PRIVACY ACT STATEMENT – HEALTH CARE RECORDS, FITNESS TEST SCORES, AND QUESTIONNAIRE

1. AUTHORITY FOR COLLECTION OF INFORMATION INCLUDING SOCIAL SECURITY NUMBER

Public Law 104-191, Section 1178; Executive Order 9397; Section 8103, Title 5, United States Code

2. PRINCIPLE PURPOSES FOR WHICH INFORMATION IS INTENDED TO BE USED

This form provides you the advice required by the Privacy Act of 1974. The information obtained from this project will be used to determine if cross-training types of physical fitness programs have an effect on injuries, limited duty days, and physical fitness. We will need to obtain your social security number in order to link your questionnaire information with other data such as Army Physical Fitness Test (APFT) scores and information on injuries you may have had in the last year. Using your social security number is the only way we can do this. We will strictly limit access to your social security number by locking up all paper files and having all computer files password protected and removing SSNs after data are linked. The questionnaire is to obtain information on current physical fitness activities, tobacco use, dietary habits and previous or current injuries.

3. ROUTINE USES

The primary use of this information is to improve the health and fitness of Soldiers. The data obtained from the questionnaires will be included in a database that contains the same information for all Soldiers participating in this project. The only personnel having access to this information will be the public health officials who will analyze the information. You will not be personally identified in any report or any output of any type since the interest is in the health and fitness of the Unit and not the health and fitness of any single individual.

The database that is established will identify current level of fitness by unit, current unit injury trends, and factors that lower Soldiers' risk of injury and enhance fitness. The database will be used to make recommendations to decision makers regarding programs and policies that might improve fitness and reduce the incidence of injury.

4. WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION

Disclosure of the requested information is voluntary. If you do not disclose the information you will not be included in the database and you will not participate in the project designed to reduce injuries and improve the health and fitness of Soldiers in your Unit.

SIGNATURE OF PARTICIPANT	**DATE**

Example of Infantry Physical Training and Injury Survey

Background Details

1. Today's date: |___|___| / |___|___| / |___|___|___|___|
   DAY MONTH YEAR

2. What is your name? _____
   (LAST NAME, FIRST NAME, MIDDLE INITIAL)

3. What is your birth date? |___|___| / |___|___| / |___|___|___|___|
   DAY MONTH YEAR

4. Are you…
   - O 0 Male
   - O 1 Female

5. What is your component?
   - O 1 Regular Army
   - O 2 Army Reserve
   - O 3 National Guard

6. When did you in-process with the 4th Infantry Division?
   |___|___| / |___|___| / |___|___|___|___|
   DAY MONTH YEAR

7. What is your current unit?
   - O 1 3-16 FA
   - O 2 1-10 CAV
   - O 3 1-67 AR
   - O 4 2-8 IN
   - O 5 204 BSB
   - O 6 2-4 STB
   - O 7 Other _____

8. What is your company?
   - O 1 A Company
   - O 2 B Company
   - O 3 C Company
   - O 4 D Company
   - O 5 E Company
   - O 6 F Company
   - O 7 G Company
   - O 8 HHC Company
   - O 9 HHB Company
   - O 10 HD Company
   - O 11 Other _____

9. What is your Military Occupational Specialty (MOS)? _____

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10. Have you been deployed?

- O 0 No
- O 1 Yes

11. If yes, how many times have you been deployed?

- O 0 I haven't been deployed
- O 1 1 time
- O 2 2 times
- O 3 3 times
- O 4 4 or more times

12. If yes, where were you deployed? (select all that apply)

- O 0 I haven't been deployed
- O 1 OEF
- O 2 OIF

Unit Physical Fitness Training (PT)

The following questions will ask about unit physical fitness training. Unit physical fitness training is defined as: exercising (i.e., road marching, running, calisthenics, or strength training ….) with a group of soldiers, such as a squad, platoon, or company.

13. What physical training program did you perform at your prior assignment (before in-processing with 4 ID)? (select all that apply)

- O 1 Traditional Army PT (distance running, pushups, situps)
- O 2 Cross-training (a variety of exercises, such as agility drills, sprints)
- O 3 TRX
- O 4 P90X
- O 5 Other (please name) _____

14. Do you currently participate in unit PT (i.e., road marching, running, calisthenics, or strength training with your unit)?

- O 1 Yes
- O 0 No (if no, skip to question 35)

15. On average, how often do you participate in unit PT each week?

- O 1 Less than 5 times per week
- O 2 5-7 times per week
- O 3 8-14 times per week
- O 4 More than 14 times per week

16. Do you participate in any alternative PT programs? If yes, which (select all that apply):

- O 0 I do not participate in any alternative PT programs
- O 1 Profile PT
- O 2 Weight Control PT
- O 3 Pregnancy PT
- O 4 Other (please name) _____

17. Who ***usually*** leads your unit's physical training sessions? (select all that apply)

- O 1 Squad leader
- O 2 Platoon SGT
- O 3 Platoon leader
- O 4 Company 1st SGT
- O 5 Company Commander
- O 6 Unspecified Soldier specially trained in specific physical training
- O 7 Other (please name) _____

18. In the past 6 months, did your unit perform cross-training type exercise programs? If so, which one (select all that apply):
Cross-training is defined as a program that involves a variety of exercises, such as strength training, agility drills, sprints, plyometrics, etc.

- O 0 Do not perform cross-training type exercise programs
- O 1 Basic cross-training types of exercises
- O 2 TRX
- O 3 P90X
- O 4 Other (please name) _____

19. If your unit performed cross-training types of exercise programs in the past 6 months, approximately how many times per week?

- O 0 Do not perform cross-training type exercise programs
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

20. Approximately when did your PT program change and you started using exercises from the new Army Training Circular (i.e. preparatory drills (i.e. forward lunges, bent leg body twist, power jumps), conditioning drills (i.e. single leg push-ups, v-ups), recovery drills (i.e. overhead arm pull, extend and flex)

- O 0 My PT program has not changed in the last 6 months
- O 1 Date started |___|___| / |___|___| / |___|___|___|___|
  DAY MONTH YEAR

21. During the last 6 months, on average, how many times per week did your unit perform distance running (i.e., running continuously for 1 mile or greater)?

- O 0 Our unit does not perform distance running
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

22. During the last 6 months, on average, how far did you run when your unit performed distance running?

- O 0 I don't perform distance runs with my unit
- O 1 1 mile
- O 2 2-3 miles
- O 3 4-5 miles
- O 4 6-7 miles
- O 5 More than 7 miles

23. During the last 6 months, on average, how often did your unit perform sprint or interval-style running?

***Sprints* are short bursts of speed that cannot be sustained for more than a few minutes. *Intervals* are short periods of high speed running mixed with periods of jogging or walking.**

- O 0 Our unit does not perform sprint or interval running
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

24. During the last 6 months, on average, how often did your unit perform calisthenics (i.e., jumping jacks, windmills, mountain climbers, etc.)?

- O 0 Our unit does not perform calisthenics
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

25. During the last 6 months, on average, how often did your unit perform resistance training (i.e., weight lifting using free weights, dumbbells, kettlebells, hammer-strength machines, etc.)?

- O 0 Our unit does not resistance train
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week

5

O 4 5-6 times per week
O 5 More than 6 times per week

26. During the last 6 months, on average, how often did your unit perform agility drills (i.e., drills requiring lateral movements, typically using cones or ladders, obstacle course, etc.)?

O 0 Our unit does not perform agility drills
O 1 Less than 1 time per week
O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-6 times per week
O 5 More than 6 times per week

27. During the last 6 months, on average, how often did your unit perform road marches?

O 0 Our unit does not perform road marches
O 1 Less than one time per month
O 2 2 times per month
O 3 3 times per month
O 4 4 times per month or once a week

28. On average, how heavy is the load you carry when your unit performs road marches?

O 0 Our unit does not perform road marches
O 1 0-15 pounds
O 2 16-30 pounds
O 3 31-50 pounds
O 4 51-75 pounds
O 5 More than 75 pounds

29. On average, how far does your unit road march at a time?

O 0 Our unit does not perform road marches
O 1 1-3 miles
O 2 4-6 miles
O 3 7-10 miles
O 4 11-15 miles
O 5 More than 15 miles

30. During the last 6 months, on average, how often does your unit run for exercise while wearing body armor?

O 0 Our unit does not run in body armor
O 1 Less than 1 time per week
O 2 1-2 times per week
O 3 3-4 times per week

O 4 5-6 times per week
O 5 More than 6 times per week

31. On average, how far does your unit run when wearing body armor?

O 0 Our unit does not run in body armor
O 1 0-1 mile
O 2 2-3 miles
O 3 4-5 miles
O 4 6-7 miles
O 5 More than 7 miles

32. During the last 6 months, on average, how often does your unit perform physical training in the swimming pool?

O 0 Our unit does not perform physical training in the swimming pool
O 1 Less than 1 time per month
O 2 1-2 times per month
O 3 3-4 times per month
O 4 5-6 times per month
O 5 More than 6 times per month

33. During the last 6 months, how often did your unit specifically train for the APFT (i.e., pushup/sit-ups/2-mile run)?

O 0 Our unit does not specifically train for the APFT
O 1 Less than 1 time per month
O 2 1-2 times per month
O 3 3-4 times per month
O 4 5-6 times per month
O 5 More than 6 times per month

34. Who develops your unit's physical training calendar?

O 1 Squad leader
O 2 Platoon SGT
O 3 Platoon leader
O 4 Company 1st SGT
O 5 Company Commander
O 6 Other (please name)_____

35. Do you lead PT for your squad or platoon?

O 1 Yes
O 0 No

36. If you do lead PT for your squad or platoon have you attended the Iron Horse Train the Trainer class?

O 2 Do not lead PT
O 1 Yes
O 0 No

Personal Physical Fitness Training (PT)

The following questions will ask about your personal physical fitness training (PT). Personal PT is any physical fitness training *not* conducted with your unit. Please answer these questions with regard to your *current* personal PT program.

37. Do you perform your own personal PT?

O 1 Yes
O 0 No

38. How often do you perform distance running for personal PT (i.e., running continuously for 1 mile or more)?

O 0 I don't perform distance runs on my own
O 1 Less than 1 time per week
O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-6 times per week
O 5 More than 6 times per week

39. How far do you run when you perform distance runs for personal PT?

O 0 I don't perform distance runs on my own
O 1 1 mile
O 2 2-3 miles
O 3 4-5 miles
O 4 6-7 miles
O 5 More than 7 miles

40. How often do you perform resistance training for personal PT? (i.e., weight lifting using free weights, dumbbells, kettlebells, hammer-strength machines, etc)?

O 0 I don't perform resistance training on my own
O 1 Less than 1 time per week
O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-6 times per week
O 5 More than 6 times per week

41. How often do you perform sprint or interval-style running for personal PT?
***Sprints* are defined as short bursts of speed that cannot be sustained for more than a few minutes. *Intervals* are short periods of high speed running mixed with periods of jogging or walking.**

O 0 I don't perform sprint or interval style running on my own
O 1 Less than 1 time per week

O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-6 times per week
O 5 More than 6 times per week

42. What program is your personal physical training program based upon? (select all that apply)

O 0 I don't have a personal physical training program
O 1 Traditional Army PT
O 2 Cross-training types of exercises
O 3 TRX
O 4 P90X
O 5 Other (please name) _____

43. How would you rate your ability in each of the following categories, compared to others of your age and gender:

	Far Less Than Average 1	Less Than Average 2	Average 3	Greater Than Average 4	Far Greater Than Average 5
Endurance	O	O	O	O	O
Sprint Speed	O	O	O	O	O
Strength	O	O	O	O	O
Flexibility	O	O	O	O	O
Body Fat	O	O	O	O	O

44. What was the date of your **last** Army Physical Fitness Test (APFT) (to the best of your recollection)?

|___|___| / |___|___| / |___|___|___|___|
DAY MONTH YEAR

45. What were the raw scores on your **last** Army Physical Fitness Test (APFT)?

a. Push-Ups |___|___|___| repetitions

b. Sit-Ups |___|___|___| repetitions

c. Run |___|___| min |___|___| sec

46. What is your height? |___| feet |___|___| inches

47. What is your weight? |___|___|___| lbs

Tobacco Use

Please answer these questions with regard to your past and current tobacco use.

48. Have you ever tried cigarette smoking, even one or two puffs?

O 1 Yes
O 0 No

49. Have you smoked more than 100 cigarettes in your life? (100 cigarettes = 5 packs)

O 1 Yes
O 0 No

50. About how old were you when you smoked a whole cigarette for the first time?
(If you have never smoked a whole cigarette, write 00)

|___|___| Years Old

51. During the past 30 days, on how many days did you smoke cigarettes?
(If you have not smoked in the last 30 days, write 00)

|___|___| Days

52. During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day on average?
(If you have not smoked in the last 30 days, write 00)

|___|___| Cigarettes

53. If you used to smoke cigarettes and quit, how many months or years ago did you quit?
(If you have never smoked or are currently using, write 00)

|___|___| Months OR |___|___| Years

54. If you are currently smoking, how many years have you been smoking?
(If you have never smoked or are not currently smoking, write 00)

|___|___| Years

55. During the past 30 days, on how many days did you use smokeless tobacco (chewing tobacco, snuff, dip, etc)?
(If you have not used smokeless tobacco in the last 30 days, write 00)

|___|___| days

56. During the past 30 days, on the days you used smokeless tobacco, how many cans, pouches or plugs did you use per day, on average?
(If you have not used smokeless tobacco in the last 30 days, write 0)

|____| cans, pouches, or plugs

57. If you used to use smokeless tobacco and quit, how many months or years ago did you quit?
(If you have never used smokeless tobacco or are currently using, write 00)

|___|___| Months OR |___|___| Years

58. If you are currently using smokeless tobacco, how many years have you been using smokeless tobacco?
(If you are not currently using smokeless tobacco, write 00)

|___|___| Years

Nutrition

The next questions are about your nutrition and dietary habits. Some of these questions are about meals consumed. Meals are defined as breakfast, lunch and dinner.

59. In general, how healthy is your overall diet? Would you say…..

O 1 Excellent
O 2 Very Good
O 3 Good
O 4 Fair
O 5 Poor

60. How many times per week do you eat breakfast?

O 1 Never
O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-7 times per week

61. What is typically your largest meal during the day?

O 1 Breakfast
O 2 Lunch
O 3 Dinner
O 4 All of my meals are typically the same size

62. How many meals per week do you eat at the DFAC?

O 1 None
O 2 1-3 meals
O 3 4-6 meals
O 4 7-10 meals
O 5 more than 10 meals

63. During a typical week, how many meals do you get from fast food places?

O 0 None
O 1 1-3 meals
O 2 4-6 meals
O 3 7-10 meals
O 4 more than 10 meals

64. On an average day, how many cups, cans or bottles of soda do you drink? (do not count diet soda)

O 0 None
O 1 1-2 cans, cups or bottles
O 2 3-4 cans, cups or bottles

O 3 5-6 cans, cups or bottles
O 4 more than 6 cans, cups or bottles

65. On an average day, how many ounces of juice do you drink? (do not count punch, Hi-C, sports drinks)

O 0 None
O 1 8 ounces or 1 cups
O 2 16 ounces or 2 cups
O 3 24 ounces or 3 cups
O 4 32 ounces or 4 cups
O 5 more than 32 ounces or more than 4 cups

66. On an average day, how many ounces of water do you drink?

O 0 None
O 1 16 ounces or 2 cups
O 2 32 ounces or 4 cups
O 3 64 ounces or 8 cups
O 4 128 ounces or 16 cups
O 5 more than 1 gallon

67. On an average day, how many ounces of milk do you drink?

O 0 None
O 1 8 ounces or 1 cups
O 2 16 ounces or 2 cups
O 3 24 ounces or 3 cups
O 4 32 ounces or 4 cups
O 5 more than 32 ounces or more than 4 cups

68. If you do not drink milk, why not?

O 1 I don't like the taste
O 2 I'm lactose intolerant
O 3 I'd rather drink something else
O 4 Other reason _____

69. On an average day, how many energy drinks do you drink (the size of an 8.3 ounce RedBull® can)? For larger sized cans, estimate how many cans of RedBull® the can would hold (i.e. larger cans may be as many as 3 RedBulls®)

O 0 None
O 1 1-2 cans
O 2 3-4 cans
O 3 5-6 cans
O 4 more than 6 cans

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70. On an average day, how many sports drinks (Gatorade®, Powerade®, etc.) do you drink?

- O 0 None
- O 1 1-2 cans, cups or bottles
- O 2 3-4 cans, cups or bottles
- O 3 5-6 cans, cups or bottles
- O 4 more than 6 cans, cups or bottles

71. On an average day, how many cups of dark green vegetables (spinach, romaine lettuce, broccoli) do you eat?

- O 0 None
- O 1 1 cup raw (1/2 cup cooked)
- O 2 2 cups raw (1 cup cooked)
- O 3 3 cups raw (1 ½ cups cooked)
- O 4 4 or more cups (2 cups cooked)

72. Do you use the nutrition cards/labels in the DFAC to help guide your decisions about the foods you choose?

- O 1 Always
- O 2 Sometimes
- O 3 Never
- O 4 What labels?

73. Do you make an effort to always eat a meal (or protein/energy bar) within 30 minutes after PT or working out?

- O 1 Always
- O 2 Sometimes
- O 3 Never

74. Do you take dietary supplements (dietary supplements are taken by mouth, contain a dietary ingredient and come in many forms such as tablets, liquids, energy bars, powders and capsules)? (select all that apply)

- O 0 None
- O 1 Multivitamin
- O 2 Vitamin C
- O 3 Vitamin D
- O 4 Calcium
- O 5 Amino Acid products (such as BCAAs, Arginine, Alanine)
- O 6 Protein powder / Isolates
- O 7 Hydroxycut
- O 8 Cartnitine
- O 9 Creatine
- O 10 DHEA (Dehydroepiandrosterone)

O 11 Ginseng
O 12 Energy Bars
O 13 Ripped-fuel products
O 14 Lipo products (Lipo-6, etc.)
O 15 Nitric Oxide products (NO-Xplode, NOS, etc.)
O 16 Other_____(please specify)

Injuries

The next questions are about injuries. People can be injured accidentally or on purpose. Injuries can occur in two ways:
1) When strong sudden forces are applied to the body – these would include things like falling from a ladder, an automobile crash, or being hit by a bullet fired from a weapon.
2) When smaller forces are applied to the body over and over again (repeatedly) – these would include activities like excessive exercise or running long distances, repetitive lifting/pulling/pushing objects, or repeatedly pitching a softball.

75. With these definitions in mind, have you had an injury during the past 12 months? If so, how many different times did you have an injury where any part of your body was hurt, for example, joint sprains, muscle or tendon strains, concussion, cut finger, broken bone, or shin splints?

O 0 I have NOT been injured in the last 12 months
O 1 I have been injured in the last 12 months

Please enter the number of injuries you have had within the last 12 months:

|___|___|← *(Enter 00 if you had no injuries)*

76. To the best of your memory, in what year and month did your most recent injury happen? *(Within the past 12 months)*

|___|___| / |___|___|___|___|
MONTH YEAR

O 0 I have not been injured in the last 12 months

77. Within the last 12 months, what type of injury was your most recent injury? *(Check all that apply.)*

O 0 I have not been injured in the last 12 months
O 1 Sprain (ligament or joint)
O 2 Strain (tendon or muscle)
O 3 Dislocation (joint)
O 4 Broken/fractured bone
O 5 Bruise (contusion)
O 6 Scrape/abrasion
O 7 Cut/laceration/puncture
O 8 Loss of body part (amputation)
O 9 Tendonitis or bursitis
O 10 Nerve injury

O 11 Concussion (TBI)
O 12 Blister
O 13 Burn
O 14 Pain
O 15 Heat or cold injury (heat exhaustion, heat stroke, frostbite, hypothermia)
O 16 Other_____(please specify)

78. What part(s) of your body was injured in your most recent injury (within the last 12 months)? *(Check all that apply.)*

O 0 I have not been injured in the last 12 months
O 1 Head/face
O 2 Neck
O 3 Shoulder
O 4 Arm (upper or lower)
O 5 Elbow
O 6 Wrist
O 7 Hand/Fingers
O 8 Chest
O 9 Upper back
O 10 Abdominal area
O 11 Lower back
O 12 Hip
O 13 Pelvic area
O 14 Upper leg (thigh)
O 15 Knee
O 16 Lower Leg (Calf/Shin)
O 17 Ankle
O 18 Foot
O 19 Other_____(please specify)

79. When your most recent injury occurred (within the last 12 months) were you: *(Please check the one most appropriate box.)*

O 0 I have not been injured in the last 12 months
O 1 Performing military duties or military training (on-duty), but not deployed
O 2 Performing military duties or military training (on-duty) while deployed
O 3 Doing leisure activities (off-duty)

80. Was your <u>most recent</u> injury (within the last 12 months) accidental (unintentional) or intentionally caused by someone else? Choose one of the following:

O 0 I have not been injured in the last 12 months ⟶ ***Stop here, you have completed the questionnaire***

O 1 Accidental/unintentional ⟶ ***Continue to Question 79 and 80***

O 2 Intentional by someone else, including battle injuries ⟶ ***Skip to question 81***

81. If your most recent injury was accidental (unintentional), what activity were you doing when you were injured?

O 1 Riding or driving in or on a motorized vehicle
O 2 Exercising _____(please specify type of exercise)
O 3 Sports _____(please specify type of sport)
O 4 Walking, hiking, or road marching
O 5 Stepping or climbing
O 6 Lifting or moving heavy objects
O 7 Repairing or maintaining equipment or vehicles
O 8 Other_____(please specify)

82. If your most recent injury was accidental (unintentional), how were you injured?

O 1 Fall, jump, trip, or slip
O 2 Struck against or struck by an object or person
O 3 Cut by a sharp instrument, tool, or object
O 4 Overexertion, strenuous, or repetitive movements
O 5 Fire, hot substance or object, or steam
O 6 Environmental factors such as heat or cold
O 7 Breathing or swallowing dust, particles, liquid vapors, or fumes
O 8 Other_____(please specify)

SKIP TO QUESTION 82

83. If someone else intentionally injured you, how did they do it?

O 1 Battle Injury (Intentionally injured during combat action while deployed)

O 1 Physical assault without a weapon
O 2 Physical assault with a weapon (knife, club, etc.)
O 3 Blast (i.e., IED, RPG, land mine, grenade)
O 4 Gunshot or other high velocity missile

O 5 Injury incurred while in battle but not directly caused by the enemy (i.e., falls, slips, strains, sprains)

O 6 Other intentional cause _____ (please specify)

O 2 Non-Battle Injury (not during combat, but intentionally injured in garrison or while deployed)

O 1 Physical assault without a weapon

O 2 Physical assault with a weapon or object used as a weapon (knife, club, etc.)

O 3 Gunshot or other high velocity missile

O 4 Other intentional cause _____ (please specify)

84. For your most recent injury (within the last 12 months), did you seek or receive medical care (for example, talked to or saw a medical professional such as a medic, nurse, doctor, physician assistant, athletic trainer, or physical therapist)? *(Mark one.)*

O 1 Yes
O 0 No

85. If yes, you received medical care for your injury, please indicate who provided this medical care (select all that apply)

O 0 I did not receive medical care

Location care was given	Aide Station or Unit[1]	TMC or MTF[2]
Doctor / Physician	O	O
Physician Assistant	O	O
Nurse	O	O
Athletic Trainer	O	O
Physical Therapist	O	O
Medic	O	O
Other_____	O	O

86. For your most recent injury (within the last 12 months), were you hospitalized?

O 1 Yes
O 0 No

If YES, please enter the number of days hospitalized:

|___|___|___| ← *(Enter number of days in the boxes, ONE number to a box. If none, enter 000.)*

87. From your most recent injury (within the last 12 months), were you put on profile or limited duty?

O 1 Yes
O 0 No

If YES, please enter the number of days were you were on profile or had limited duty:

|___|___|___| ← *(Enter number of days in the boxes, ONE number to a box. If none, enter 000.)*

88. How important were each of the following factors in causing your most recent injury (within the last 12 months)?

	Major Factor for the Injury$_1$	Contributing Factor for the Injury$_2$	Not a Factor for the Injury$_3$
Lack of attention on YOUR part	O	O	O
An error or misjudgment on YOUR part	O	O	O
Lack of attention on SOMEONE ELSE'S part	O	O	O
An error or misjudgment on SOMEONE ELSE's part	O	O	O
Lack of necessary training or skill	O	O	O
Activity or task was too physically or mentally demanding	O	O	O
Equipment problem (wrong equipment, poor design, equipment failure)	O	O	O
Environmental circumstances (wet or slippery surfaces, fog, glare from the sun, etc.)	O	O	O
Alcohol, medication, or drugs	O	O	O
Other _____ (please specify)	O	O	O

Thank you for completing this questionnaire

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Appendix D

Final Survey

PRIVACY ACT STATEMENT – HEALTH CARE RECORDS, FITNESS TEST SCORES, AND QUESTIONNAIRE

1. AUTHORITY FOR COLLECTION OF INFORMATION INCLUDING SOCIAL SECURITY NUMBER

Public Law 104-191, Section 1178; Executive Order 9397; Section 8103, Title 5, United States Code

2. PRINCIPLE PURPOSES FOR WHICH INFORMATION IS INTENDED TO BE USED

This form provides you the advice required by the Privacy Act of 1974. The information obtained from this project will be used to determine if cross-training types of physical fitness programs have an effect on injuries, limited duty days, and physical fitness. We will need to obtain your social security number in order to link your questionnaire information with other data such as Army Physical Fitness Test (APFT) scores and information on injuries you may have had in the last year. Using your social security number is the only way we can do this. We will strictly limit access to your social security number by shredding all paper files after scanning, having all computer files password protected, and removing SSNs and name after data are linked. The questionnaire is to obtain information on current physical fitness activities, tobacco use, dietary habits, and previous or current injuries.

3. ROUTINE USES

The primary use of this information is to improve the health and fitness of Soldiers. The data obtained from the questionnaires will be included in a database that contains the same information for all Soldiers participating in this project. The only personnel having access to this information will be the public health officials who will analyze the information. You will not be personally identified in any report or any output of any type since the interest is in the health and fitness of the Unit and not the health and fitness of any single individual.

The database that is established will identify current level of fitness by unit, current unit injury trends, and factors that lower Soldiers' risk of injury and enhance fitness. The database will be used to make recommendations to decision makers regarding programs and policies that might improve fitness and reduce the incidence of injury.

4. WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION

Disclosure of the requested information is voluntary. If you do not disclose the information you will not be included in the database and you will not participate in the project designed to reduce injuries and improve the health and fitness of Soldiers in your Unit.

SIGNATURE OF PARTICIPANT	**DATE**

Example of Physical Training and Injury Follow Up Survey

Directions: Please carefully read the directions for each section. Be sure to darken bubbles completely. Do not use checks or "x"s to fill in the bubbles. Not filling in the circles completely may result in scanning errors. Please be sure to write legibly where a written answer is required.

Background Details

1. Today's date: |___|___| / |___|___| / |___|___|___|___|
   DAY MONTH YEAR

2. What is your name? |___|___|___|___|___|___|___|___|___|___|___|___|
   LAST NAME

   |___|___|___|___|___|___|___|___|___|___|___|___|
   FIRST NAME

   |___|
   MIDDLE INITIAL

3. What is your birth date? |___|___| / |___|___| / |___|___|___|___|
   DAY MONTH YEAR

4. Are you…
   - O 0 Male
   - O 1 Female

5. What is your component?
   - O 1 Regular Army
   - O 2 Army Reserve
   - O 3 National Guard

6. When did you in-process with the 4th Infantry Division?

   |___|___| / |___|___|___|___|
   MONTH YEAR

7. What is your current unit?
   - O 1 3-16 FA
   - O 2 1-10 CAV
   - O 3 1-67 AR
   - O 4 2-8 IN
   - O 5 204 BSB
   - O 6 2-4 STB
   - O 7 HHC
   - O 8 Other _____

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8. What is your company?

- O 1 A Company
- O 2 B Company
- O 3 C Company
- O 4 D Company
- O 5 E Company
- O 6 F Company
- O 7 G Company
- O 8 HHC Company
- O 9 HHB Company
- O 10 HD Company
- O 11 Other _____

9. What is your primary Military Occupational Specialty (MOS)? _____

10. What is your duty MOS while deployed? _____

11. What is your rank?

O 1 E1 O 2 E2 O 3 E3 O 4 E4 O 5 E5 O 6 E6 O 7 E7 O 8 E8 O 9 E9

O 10 O1 O 11 O2 O 12 O3 O 13 O4 O 14 O5 O 15 O6

O 16 W1 O 17 W2 O 18 W3 O 19 W4 O 20 W5

12. Have you been deployed?

- O 0 No
- O 1 Yes

13. If yes, how many times have you been deployed?

- O 0 I haven't been deployed
- O 1 1 time
- O 2 2 times
- O 3 3 times
- O 4 4 or more times

14. If yes, where were you deployed? (select all that apply)

- O 0 I haven't been deployed
- O 1 OEF
- O 2 OIF
- O 3 Other_____

Unit Physical Fitness Training (PT)

The following questions will ask about unit physical fitness training. Unit physical fitness training is defined as: exercising (i.e., road marching, running, calisthenics, or strength training ….) with a group of soldiers, such as a squad, platoon, or company.

15. Approximately when did your unit's PT program change and start using exercises from the Iron Horse Performance Optimization (IHPO) fitness program such as preparatory drills (e.g. forward lunges, bent leg body twist, power jumps), conditioning drills (e.g. single leg push-ups, v-ups), and recovery drills (e.g. overhead arm pull, extend and flex).

O 0 My unit's PT program has not changed
O 1 Yes, unit has adopted IHPO exercises/drills

If Yes when |___|___| / |___|___|___|___|
Month **Year**

16. Do you currently participate in unit PT (i.e., road marching, running, calisthenics, or strength training with your unit)?

O 1 Yes
O 0 No **(if no, skip to question 39)**

17. On average, how often do you participate in unit PT each week?

O 1 Less than 5 times per week
O 2 5-7 times per week
O 3 8-14 times per week
O 4 More than 14 times per week

18. Do you currently participate in any Army-specific alternative PT programs? If yes, which (select all that apply):

O 0 I do not participate in any alternative PT programs
O 1 Profile PT
O 2 Weight Control PT
O 3 Pregnancy PT
O 4 Other (please name) _____

19. Who ***usually*** leads your unit's physical training sessions? (select all that apply)

O 1 Squad leader
O 2 Platoon SGT
O 3 Platoon leader
O 4 Company 1st SGT
O 5 Company Commander
O 6 Unspecified Soldier specially trained in IHPO exercises/drills
O 7 Other (please name) _____

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20. In the past 6 months, did your unit perform cross-training type exercise programs? If so, which one (select all that apply):

Cross-training is defined as a program that involves a variety of exercises, such as strength training, agility drills, sprints, plyometrics, etc.

- O 0 Do not perform cross-training type exercise programs
- O 1 Basic cross-training types of exercises
- O 2 TRX
- O 3 P90X
- O 4 Crossfit
- O 5 Iron Horse Performance Optimization (IHPO)
- O 6 Other (please name) _____

21. If your unit performed cross-training types of exercise programs in the past 6 months, approximately how many times per week?

- O 0 Do not perform cross-training type exercise programs
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

22. During the last 6 months, on average, how many times per week did your unit perform distance running (i.e., running continuously for 1 mile or greater)?

- O 0 Our unit does not perform distance running
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

23. During the last 6 months, on average, how far did you run when your unit performed distance running?

- O 0 I don't perform distance runs with my unit
- O 1 1 mile
- O 2 2-3 miles
- O 3 4-5 miles
- O 4 6-7 miles
- O 5 More than 7 miles

24. During the last 6 months, on average, how often did your unit perform sprint or interval-style running? ***Sprints*** **are short bursts of speed that cannot be sustained for more than a few minutes.** ***Intervals*** **are short periods of high speed running mixed with periods of jogging or walking.**

- O 0 Our unit does not perform sprint or interval running
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

25. During the last 6 months, on average, how often did your unit perform calisthenics (i.e., jumping jacks, windmills, mountain climbers, etc.)?

- O 0 Our unit does not perform calisthenics
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

26. During the last 6 months, on average, how often did your unit perform resistance training (i.e., weight lifting using free weights, dumbbells, kettlebells, hammer-strength machines, etc.)?

- O 0 Our unit does not resistance train
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

27. During the last 6 months, on average, how often did your unit perform agility drills (i.e., drills requiring lateral movements, typically using cones or ladders, obstacle course, etc.)?

- O 0 Our unit does not perform agility drills
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

28. During the last 6 months, on average, how often did your unit perform road marches?

- O 0 Our unit does not perform road marches
- O 1 Less than one time per month
- O 2 2 times per month
- O 3 3 times per month
- O 4 4 times per month or once a week

29. On average, how heavy is the load you carry when your unit performs road marches?

- O 0 Our unit does not perform road marches
- O 1 0-15 pounds
- O 2 16-30 pounds
- O 3 31-50 pounds
- O 4 51-75 pounds
- O 5 More than 75 pounds

30. On average, how far does your unit road march at a time?

- O 0 Our unit does not perform road marches
- O 1 1-3 miles
- O 2 4-6 miles
- O 3 7-10 miles
- O 4 11-15 miles
- O 5 More than 15 miles

31. During the last 6 months, on average, how often does your unit run for exercise while wearing body armor?

- O 0 Our unit does not run in body armor
- O 1 Less than 1 time per week
- O 2 1-2 times per week
- O 3 3-4 times per week
- O 4 5-6 times per week
- O 5 More than 6 times per week

32. On average, how far does your unit run when wearing body armor?

- O 0 Our unit does not run in body armor
- O 1 0-1 mile
- O 2 2-3 miles
- O 3 4-5 miles
- O 4 6-7 miles
- O 5 More than 7 miles

33. During the last 6 months, on average, how often does your unit perform physical training in the swimming pool?

- O 0 Our unit does not perform physical training in the swimming pool
- O 1 Less than 1 time per month
- O 2 1-2 times per month
- O 3 3-4 times per month
- O 4 5-6 times per month
- O 5 More than 6 times per month

34. During the last 6 months, how often did your unit specifically train for the APFT (i.e., pushup/sit-ups/2-mile run)?

- O 0 Our unit does not specifically train for the APFT
- O 1 Less than 1 time per month
- O 2 1-2 times per month
- O 3 3-4 times per month
- O 4 5-6 times per month
- O 5 More than 6 times per month

35. Who develops your unit's physical training calendar?

_____

36. Do you lead PT for your squad or platoon?

- O 1 Yes
- O 0 No

37. If you lead PT for your squad or platoon have you attended the Iron Horse Train the Trainer class?

- O 2 Do not lead PT
- O 1 Yes
- O 0 No

Personal Physical Fitness Training (PT)

The following questions will ask about your personal physical fitness training (PT). Personal PT is any physical fitness training *not* conducted with your unit. Please answer these questions with regard to your *current* personal PT program.

38. Do you perform PT on your own time?

- O 1 Yes
- O 0 No

39. How often do you perform distance running for personal PT (i.e., running continuously for 1 mile or more)?

- O 0 I don't perform distance runs on my own
- O 1 Less than 1 time per week

8

O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-6 times per week
O 5 More than 6 times per week

40. How far do you run when you perform distance runs for personal PT?

O 0 I don't perform distance runs on my own
O 1 1 mile
O 2 2-3 miles
O 3 4-5 miles
O 4 6-7 miles
O 5 More than 7 miles

41. How often do you perform resistance training for personal PT? (i.e., weight lifting using free weights, dumbbells, kettlebells, hammer-strength machines, etc)?

O 0 I don't perform resistance training on my own
O 1 Less than 1 time per week
O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-6 times per week
O 5 More than 6 times per week

42. How often do you perform sprint or interval-style running for personal PT?
***Sprints* are defined as short bursts of speed that cannot be sustained for more than a few minutes.**
***Intervals* are short periods of high speed running mixed with periods of jogging or walking.**

O 0 I don't perform sprint or interval style running on my own
O 1 Less than 1 time per week
O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-6 times per week
O 5 More than 6 times per week

43. What program is your personal physical training program based upon? (select all that apply)

O 0 I don't have a personal physical training program
O 1 Traditional Army PT
O 2 Cross-training types of exercises
O 3 TRX
O 4 P90X
O 5 Crossfit
O 6 IHPO
O 7 Other (please name) _____

9

44. How would you rate your ability in each of the following categories, compared to others of your age and gender:

	Far Less Than Average 1	Less Than Average 2	Average 3	Greater Than Average 4	Far Greater Than Average 5
Endurance	O	O	O	..... O	O
Sprint Speed	O	O	O	..... O	O
Strength	O	O	O	..... O	O
Flexibility	O	O	O	..... O	O
Body Fat*	O	O	O	..... O	O

* For Body Fat "Far Less Than Average" means you have far less body fat than others compared to your age and gender.

45. What was the date of your **last** Army Physical Fitness Test (APFT) (to the best of your recollection)?

|___|___| / |___|___|___|___|
MONTH **YEAR**

46. What were the raw scores on your **last** Army Physical Fitness Test (APFT)?

a. Push-Ups |___|___|___| repetitions

b. Sit-Ups |___|___|___| repetitions

c. Run |___|___| min |___|___| sec

47. What is your height? |___| feet |___|___| inches

48. What is your weight? |___|___|___| lbs

Tobacco Use

Please answer these questions with regard to your past and current tobacco use.

49. Have you smoked more than 100 cigarettes in your life? (100 cigarettes = 5 packs)

O 1 Yes
O 0 No

50. About how old were you when you smoked a whole cigarette for the first time?

O 0 I have never smoked a whole cigarette
O 1 I have smoked a whole cigarette |___|___| Age when first cigarette smoked

51. During the past 30 days, on how many days did you smoke cigarettes?

O 0 I have not smoked in the last 30 days
O 1 I have smoked in the last 30 days |___|___| Number of days smoked

10

52. During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day on average?

O 0 I have not smoked in the last 30 days
O 1 I have smoked in the last 30 days |___|___| Number of cigarettes smoked

53. If you used to smoke cigarettes and quit, how many months or years ago did you quit?

O 0 I have never smoked or I am currently smoking
O 1 I have quit smoking |___|___| Months OR |___|___| Years quit

54. If you are currently smoking cigarettes, how many years have you been smoking?

O 0 I have never smoked or I am currently not smoking cigarettes
O 1 I am currently smoking |___|___| Number of years smoked

55. During the past 30 days, on how many days did you use smokeless tobacco (chewing tobacco, snuff, dip, etc)?

O 0 I have not used smokeless tobacco in the last 30 days
O 1 I have used smokeless tobacco in the last 30 days |___|___| Number of days used smokeless

56. During the past 30 days, on the days you used smokeless tobacco, how many cans, pouches or plugs did you use per day, on average?

O 0 I have not used smokeless tobacco in the last 30 days
O 1 I have used smokeless tobacco in the last 30 days

|___|___| Number of cans **or** |___|___| Number of pouches **or** |___|___| Number of plugs

57. If you used to use smokeless tobacco and quit, how many months or years ago did you quit?

O 0 I have never used smokeless tobacco or I am currently using smokeless tobacco
O 1 I have quit using smokeless tobacco |___|___| Months OR |___|___| Years quit

58. If you are currently using smokeless tobacco, how many years have you been using smokeless tobacco?

O 0 I have never used smokeless tobacco or I am not currently using smokeless tobacco
O 1 I am currently using smokeless tobacco |___|___| Number of years used smokeless

Nutrition

The next questions are about your nutrition and dietary habits. Some of these questions are about meals consumed. Meals are defined as breakfast, lunch and dinner.

59. In general, how healthy is your overall diet? Would you say…..

O 1 Excellent
O 2 Very Good
O 3 Good
O 4 Fair
O 5 Poor

60. How many times per week do you eat breakfast?

O 1 Never
O 2 1-2 times per week
O 3 3-4 times per week
O 4 5-7 times per week

61. What is typically your largest meal during the day?

O 1 Breakfast
O 2 Lunch
O 3 Dinner
O 4 All of my meals are typically the same size

62. How many meals per week do you eat at the DFAC?

O 1 None
O 2 1-3 meals
O 3 4-6 meals
O 4 7-10 meals
O 5 more than 10 meals

63. Do you use the nutrition cards/labels in the DFAC to help guide your decisions about the foods you choose?

O 1 Always
O 2 Sometimes
O 3 Never
O 4 What labels?

64. During a typical week, how many meals do you get from fast food restaurants?

O 0 None
O 1 1-3 meals
O 2 4-6 meals

12

O 3 7-10 meals
O 4 more than 10 meals

65. On an average day, how many cups, cans or bottles of soda do you drink?

O 0 None
O 1 1-2 cans, cups or bottles
O 2 3-4 cans, cups or bottles
O 3 5-6 cans, cups or bottles
O 4 more than 6 cans, cups or bottles

66. On an average day, how many ounces of water do you drink?

O 0 None
O 1 16 ounces or 2 cups
O 2 32 ounces or 4 cups
O 3 64 ounces or 8 cups
O 4 128 ounces or 16 cups
O 5 more than 1 gallon

67. On an average day, how many energy drinks do you drink (the size of an 8.3 ounce RedBull® can)? For larger sized cans, estimate how many cans of RedBull® the can would hold (i.e. larger cans may be as many as 3 RedBulls®)

O 0 None
O 1 1-2 cans
O 2 3-4 cans
O 3 5-6 cans
O 4 more than 6 cans

68. On an average day, how many sports drinks (Gatorade®, Powerade®, etc.) do you drink?

O 0 None
O 1 1-2 cans, cups or bottles
O 2 3-4 cans, cups or bottles
O 3 5-6 cans, cups or bottles
O 4 more than 6 cans, cups or bottles

69. On an average day, how many cups of dark green vegetables (spinach, romaine lettuce, broccoli) do you eat?

O 0 None
O 1 1 cup raw or (1/2 cup cooked)
O 2 2 cups raw or (1 cup cooked)
O 3 3 cups raw or (1 ½ cups cooked)
O 4 4 or more cups or (2 cups cooked)

70. Do you make an effort to always eat a meal (or protein/energy bar) within 30 minutes after PT or working out?

- O 1 Always
- O 2 Sometimes
- O 3 Never

71. Do you take dietary supplements? (select all that apply)

Dietary supplements are taken by mouth and come in many forms (i.e. tablets, liquids, energy bars, powders and capsules.

- O 0 None
- O 1 Multivitamin
- O 2 Vitamin C
- O 3 Vitamin D
- O 4 Calcium
- O 5 Amino Acid products (such as BCAAs, Arginine, Alanine)
- O 6 Protein powder / Isolates
- O 7 Hydroxycut
- O 8 Cartnitine
- O 9 Creatine
- O 10 DHEA (Dehydroepiandrosterone)
- O 11 Ginseng
- O 12 Energy Bars
- O 13 Ripped-fuel products
- O 14 Lipo products (Lipo-6, etc.)
- O 15 Nitric Oxide products (NO-Xplode, NOS, etc.)
- O 16 Other_____(please specify)

Injuries

The next questions are about injuries. People can be injured accidentally or on purpose. Injuries can occur in two ways:
1) When strong sudden forces are applied to the body – these would include things like falling from a ladder, an automobile crash, or being hit by a bullet fired from a weapon.
2) When smaller forces are applied to the body over and over again (repeatedly) – these would include activities like excessive exercise or running long distances, repetitive lifting/pulling/pushing objects, or repeatedly pitching a softball.

72. With these definitions in mind, have you had an injury during the past 6 months? If so, how many different times did you have an injury where any part of your body was hurt, for example, joint sprains, muscle or tendon strains, concussion, cut finger, broken bone, or shin splints?

O 0 I have NOT been injured in the last 6 months
O 1 I have been injured in the last 6 months

Please enter the number of injuries you have had within the last 6 months:

|___|___| ← *(Enter 00 if you had no injuries)*

73. Within the past 6 months, in what year and month did your **most recent** injury happen?

|___|___| / |___|___|___|___|
MONTH YEAR

O 0 I have not been injured in the last 6 months

74. Within the last 6 months, what type of injury was your most recent injury? ***(Please select the one most appropriate.)***

O 0 I have not been injured in the last 6 months
O 1 Sprain (ligament or joint)
O 2 Strain (tendon or muscle)
O 3 Dislocation (joint)
O 4 Broken/fractured bone
O 5 Bruise (contusion)
O 6 Scrape/abrasion
O 7 Cut/laceration/puncture
O 8 Loss of body part (amputation)
O 9 Tendonitis or bursitis
O 10 Nerve injury
O 11 Concussion (TBI)
O 12 Blister
O 13 Burn
O 14 Pain

O 15 Heat or cold injury (heat exhaustion, heat stroke, frostbite, hypothermia)
O 16 Other_____(please specify)

75. What part of your body was injured in your most recent injury (within the last 6 months)? ***(Please select the one most appropriate.)***

O 0 I have not been injured in the last 6 months
O 1 Head/face
O 2 Neck
O 3 Shoulder
O 4 Arm (upper or lower)
O 5 Elbow
O 6 Wrist
O 7 Hand/Fingers
O 8 Chest
O 9 Upper back
O 10 Abdominal area
O 11 Lower back
O 12 Hip
O 13 Pelvic area
O 14 Upper leg (thigh)
O 15 Knee
O 16 Lower Leg (Calf/Shin)
O 17 Ankle
O 18 Foot
O 19 Other_____(please specify)

76. When your most recent injury occurred (within the last 6 months) were you: ***(Please select the one most appropriate.)***

O 0 I have not been injured in the last 6 months
O 1 Performing military duties or military training (on-duty), but not deployed
O 2 Performing military duties or military training (on-duty) while deployed
O 3 Doing leisure activities (off-duty)

77. Was your **most recent** injury (within the last 6 months) accidental (unintentional) or intentionally caused by someone else? Choose one of the following:

O 0 I have not been injured in the last 6 months → ***STOP HERE, you have completed the questionnaire. Please turn in your questionnaire.***
O 1 Accidental/unintentional → ***CONTINUE to Question 79 and 80***

O 2 Intentional by someone else, including battle injuries → ***Skip to question 81***

78. If your most recent injury was accidental (unintentional), what activity were you doing when you were injured? ***(Please select the one most appropriate.)***

O 1 Riding or driving in or on a motorized vehicle
O 2 Walking, hiking, or road marching
O 3 Running
O 4 Sports _____(please specify type of sport)
O 5 Other Exercise _____(please specify type of exercise)
O 6 Stepping or climbing (stairs, ladder)
O 7 Lifting or moving heavy objects
O 8 Repairing or maintaining equipment or vehicles
O 9 Other_____(please specify)

79. If your most recent injury was accidental (unintentional), how were you injured? ***(Please select the one most appropriate.)***

O 1 Fall, jump, trip, or slip
O 2 Struck against or struck by an object or person
O 3 Cut by a sharp instrument, tool, or object
O 4 Overexertion, strenuous, or repetitive movements
O 5 Fire, hot substance or object, or steam
O 6 Environmental factors such as heat or cold
O 7 Breathing or swallowing dust, particles, liquid vapors, or fumes
O 8 Other_____(please specify)

SKIP TO QUESTION 82

80. If someone else intentionally injured you, how did they do it? **(Please select only one answer from either A OR B)**

A. Battle Injury (Intentionally injured during combat action while deployed)

O 1 Physical assault without a weapon
O 2 Physical assault with a weapon (knife, club, etc.)
O 3 Blast (i.e., IED, RPG, land mine, grenade)
O 4 Gunshot or other high velocity missile
O 5 Injury incurred while in battle but not directly caused by the enemy (i.e., falls, slips, strains, sprains)
O 6 Other intentional cause _____ (please specify)

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B. Non-Battle Injury (not during combat, but intentionally injured in garrison or while deployed)

O 1 Physical assault without a weapon
O 2 Physical assault with a weapon or object used as a weapon (knife, club, etc.)
O 3 Gunshot or other high velocity missile
O 4 Other intentional cause
_____ (please specify

81. For your most recent injury (within the last 6 months), did you seek or receive medical care (for example, talked to or saw a medical professional such as a medic, nurse, doctor, physician assistant, athletic trainer, or physical therapist)? *(select one.)*

O 1 Yes
O 0 No

82. If yes, you received medical care for your injury, please indicate who provided this medical care (select all that apply)

O 0 I did not receive medical care

	Aide Station or Unit$_1$	TMC or MTF$_2$	Other Facility$_3$
Doctor / Physician	O	O	O
Physician Assistant	O	O	O
Nurse	O	O	O
Athletic Trainer	O	O	O
Physical Therapist	O	O	O
Medic	O	O	O
Other_____	O	O	O

83. For your most recent injury (within the last 6 months), were you hospitalized?

O 1 Yes
O 0 No

If YES, please enter the number of days hospitalized:

|___|___|___| ← *(Enter number of days in the boxes, ONE number to a box.)*

84. From your most recent injury (within the last 6 months), were you put on profile or limited duty?

O 1 Yes
O 0 No

If YES, please enter the number of days you were on profile or had limited duty:

|___|___|___| *(Enter number of days in the boxes, ONE number to a box.)*

85. How important were each of the following factors in causing your most recent injury (within the last 6 months)?

	Major Factor for the Injury$_1$	Contributing Factor for the Injury$_2$	Not a Factor for the Injury$_3$
Lack of attention on YOUR part	O	O	O
An error or misjudgment on YOUR part	O	O	O
Lack of attention on SOMEONE ELSE'S part	O	O	O
An error or misjudgment on SOMEONE ELSE's part	O	O	O
Lack of necessary training or skill	O	O	O
Activity or task was too physically or mentally demanding	O	O	O
Equipment problem (wrong equipment, poor design, equipment failure)	O	O	O
Environmental circumstances (wet or slippery surfaces, fog, glare from the sun, etc.)	O	O	O
Alcohol, medication, or drugs	O	O	O
Other _____(please specify)	O	O	O

Thank you for completing this questionnaire.